

**Queens West (Hunter's Point)  
Center Boulevard  
Draft Upland Site Summary**

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**QUEENS WEST (HUNTER'S POINT) CENTER BOULEVARD (DAR SITE ID #133)**

Address: Center Boulevard and 47th Road and 48th Avenue,  
Long Island City, New York 11109  
(4-75 48th Avenue; 4-63 48th Avenue; 4-46 47th Road)

Tax Lot Parcel(s): Queens Block 19, Lots 2, 10, 15, 19, 20, and 21

Latitude: 40.745292

Longitude: -73.957746

Regulatory Programs/  
Numbers/Codes: VCP No. V00194A, BCP No. C241049 and C241087, USEPA ID  
No. NYR000047332, NYSDEC Spill No. 1000420 and 1005513,  
PBS No. 2-609907 and 2-611726

Analytical Data Status: ☐ Electronic Data Available ☒ Hardcopies only  
☐ No Data Available

**1 SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN (COPCs) TRANSPORT  
PATHWAYS TO THE CREEK**

The current understanding of the transport mechanisms of COPCs from the upland portions of the Queens West (Hunter's Point) Center Boulevard site (site) to Newtown Creek is summarized in this section and Table 1 and supported in the following sections.

**Overland Transport**

The site is 0.34 mile from Newtown Creek and associated waterways. This is not a complete current or historical pathway.

**Bank Erosion**

The site is not adjacent to Newtown Creek and associated waterways. This is not a complete current or historical pathway.

### **Groundwater**

Groundwater at the site is approximately 8 to 10 feet below ground surface (bgs) and generally flows in a westerly direction toward the East River. Subsurface structures and utility corridors present on Center Boulevard are thought to influence groundwater flow patterns, creating localized groundwater flow to the east and south in some areas of the site (Fleming 2010a). There is insufficient information to make a current or historical pathway determination.

### **Overwater Activities**

The site is 0.34 mile from Newtown Creek and associated waterways. This is not a complete current or historical pathway.

### **Stormwater/Wastewater Systems**

This site is within the Bowery Bay Water Pollution Control Plant (WPCP) sewershed. Stormwater at the site is expected to drain directly to the East River (based on topography) or flow into combined sewer systems. Wastewater discharges from the site flow into a combined sewer system. When the combined flows exceed the system's capacity, untreated combined sewer overflows (CSOs) are discharged to the East River (NYCDEP 2007). Stormwater and wastewater systems, therefore, are not a complete pathway.

### **Air Releases**

Ambient air samples were collected at the site and compared to background ambient samples collected in the surrounding neighborhood in 2009. With the exception of a slightly higher concentration of total xylenes, volatile organic compounds (VOC) concentrations in samples collected at the site were similar to the background concentrations (Fleming 2010a). No additional information about air releases from the site was identified in documents available for review. There is insufficient evidence to make a current or historical pathway determination.

## **2 PROJECT STATUS**

Initially, Voluntary Cleanup Program (VCP) Site No. V00194 included Queens West Parcels 8 (Lot 21), 9 (Lot 19), 11 (Queens Block 17, Lots 28 and 29; DAR Site ID #138), and

Center Boulevard (Lot 20) and were addressed by a single Voluntary Cleanup Agreement (VCA), dated August 17, 1999 (Fleming 2010a). In July 2000, that VCA was amended to remove Parcels 8, 9, and 11, from the original agreement. Separate VCAs were then executed for each parcel by the designated developer for the parcel. Parcels 8 and 9 were transitioned from the VCP to the Brownfield Cleanup Program (BCP; BCP Site Nos. C241087 and C241049, respectively). By 2010, remediation was complete on all parcels except for Parcel 8 (Lot 21) and Center Boulevard (Lot 20; Fleming 2010a).

Records indicate the site is an active Resource Conservation and Recovery Act (RCRA) large quantity generator (LQG; USEPA 2011). A summary of investigation and remedial activities at the site is provided in the following table:

Activity		Date(s)/Comments
Phase 1 Environmental Site Assessment	<input checked="" type="checkbox"/>	The Remedial Action Work Plan (RAWP) indicates that there were no Phase 1 reports prepared for the site but there were six Phase 2 reports (Fleming 2010c).
Site Characterization	<input type="checkbox"/>	
Remedial Investigation	<input checked="" type="checkbox"/>	A remedial investigation was conducted from October 2008 through November 2009 (Fleming 2010a).
Remedy Selection	<input checked="" type="checkbox"/>	A Remedial Investigation Work Plan was prepared on July 13, 2009, and a RAWP was developed in August 2010 (Fleming 2010a).
Remedial Design/Remedial Action Implementation	<input checked="" type="checkbox"/>	Remediation Work Plans were attached to VCA No. D2-003-98-10, in August 1999, but Parcel 8 was later removed and became BCP C241087. Remediation has not been completed at Parcel 8 (Fleming 2010a).
Use Restrictions (Environmental Easements or Institutional Controls)	<input checked="" type="checkbox"/>	The site has had four Environmental Easements filed on July 27, September 1 and 16, 2010 and August 2, 2011 (Desnoyers 2010a, 2010b, 2010c, 2011).
Construction Completion	<input type="checkbox"/>	
Site Closeout/No Further Action Determination	<input type="checkbox"/>	

Notes:

BCP – Brownfield Cleanup Program

RAWP – Remedial Action Work Plan

VCA – Voluntary Cleanup Agreement

- New York State Department of Environmental Conservation (NYSDEC) Site Code(s): VCP No. V00194A; BCP No. C241049 and C241087
- NYSDEC Site Manager: Sondra Martinkat, (718) 482-4891

### 3 SITE OWNERSHIP HISTORY

Respondent Member:

☐ Yes ☒ No

Owner	Years	Occupant	Type of Operation
<b>Lot 21 (Parcel 8)</b>			
Unknown	1855 – 1915	Warren Chemical Company	Roofing materials manufacturer
	1915 – 1930s	Vacant	
	1930s – 1950s	The Liquid Carbonic Company	Produced liquefied carbon dioxide for use in soda fountains
	1970	Unknown	Metal storage warehouse
Pamela Rankin-Smith	1973 – 2001	The Hallen Construction Company, Inc.	Unknown
<b>Lots 2, 10, 15, 19 (Parcel 9)</b>			
Jonathan Crane & Charles Ely	1853 through approximately 1890	Unknown	
Cyrus M. Warren	1898 – 1915	Barber Asphalt Paving Co.	Asphalt manufacturer
	ca. 1891	Lawson & Valentine Varnish Works	Varnish manufacturer
	1915 – 1936	Blau Gas Company of America	Gas Manufacturer
Cyrus M. Warren & Factor Realty Corporation	1915 – 1950	Edward Smith Varnish Works	Varnish manufacturer
Factor Realty Corporation	ca. 1930 – ca. 1958	Crest Supply Corporation	Plumbing supplier

Owner	Years	Occupant	Type of Operation
Factor Realty Corporation	ca. 1936	Stanley Barrel Corporation	Barrel manufacturer
		Kelly Dry Ginger Ale Corporation	Ginger ale manufacturer
Benjamin Farber & Leo Farber	1936 - 1950	Harlem Chemical Company	Manufacturers of insect exterminator fluid
	ca. 1947 – ca. 1950	Unknown	Chemical manufacturer
			Refrigerator equipment manufacturer
463 48th Avenue Corporation (A. Arthur Smith & Bankers Trust Co.)	ca. 1950s – 1973	Unknown	
	1970	HUB Paint Works	Unknown
		Adam Metal Supply	
Pamela Rankin-Smith	ca. 1977 – ca. 1996	Charles Offset Co. Inc.	Lithography printing
	1981 – 1990	Tige Real Estate Development Corp. (1981 through 2014)	Unknown
Pamela Rankin-Smith & Vann Witcher	1990 – 1998	Unknown	Redevelopment
Queens West Development Corporation	1999 – present	Avalon Riverview North	Residential

## Notes:

ca. – circa

Co. – company

Corp. – corporation

#### 4 PROPERTY DESCRIPTION

The site includes six tax lots (Lots 2, 10, 15, 19, 20 and 21). A tax lot map is provided as Attachment 1. The property occupies approximately 4.23 acres located on the east bank of the East River, as shown on Figure 1. The site is approximately 0.34 mile northeast of the confluence of Newtown Creek and the East River. The site is at approximately 5 feet above mean sea level and slopes gently down from the east to the west towards the East River. It is occupied by a public park, a residential/commercial building, and a vacant lot.

The site is bounded by 47th Road to the north, 48th Avenue to the south, 5th Street to the east, and the East River to the west. Three high-rise residential buildings are located immediately east, northeast, and northwest of the site. A high-rise residential building, which includes a public elementary school and a day care center, is located to the southeast, across 48th Avenue. The area is zoned M3-1 (manufacturing). M3 districts are designated for areas with heavy industries that generate noise, traffic, or pollutants (NYCDCP 2011). A 2010 aerial photograph of the site is presented as Figure 1 and a 2010 site plan is included as Attachment 2.

## **5 CURRENT SITE USE**

The site is currently occupied by a paved road with underground utilities such as sewers, water lines, electric and telephone communications, a public park, a vacant lot, and a residential/commercial building called the Avalon Riverview North Building (NYSDEC 2012a).

## **6 SITE USE HISTORY**

By the turn of the century, the western portion of the site was occupied by the Warren Chemical Company from approximately 1855 to 1915 (Sanborn 1898 – 1903; Fleming 2010a). Aboveground storage tanks (ASTs) and underground storage tanks (USTs) were present throughout the property. On-site operations included a grease factory, boiling shop, forge shop, oil shed, numerous stills, and storage of manufactured materials in piles 20 feet high, adjacent to the East River. Barber Asphalt Company operated on a portion of the site adjacent to present-day 48th Avenue. The eastern portion of the site was occupied by the Lawson & Valentine Varnish Works, although operations at the facility had been discontinued (Sanborn 1898 – 1903).

From 1911 to 1917, the eastern portion of the site was occupied by the Edward Smith Varnish Works, the Barber Asphalt Paving Company, and Blau Gas Company of America. Edward Smith Varnish Works operated a mill on the corner of present-day 5th Street and 47th Road. Gum storage, other storage units, and offices existed along 5th Street. A kettles building, a thinning building, a boiling room, and additional gum storage were located adjacent to 47th Road. The center of Edward Smith's property contained a shipping area,

underground and aboveground turpentine storage tanks, two aboveground oil tanks, and an unidentified underground tank. The Barber Asphalt Company facility, including a machine shop and a steam roller shed, was located on present-day 48th Avenue. Blau Gas Company of America operations included a gas engine air compressor, a compressing room, a purifying room with a gas tank, a bottling area, a gas holder with internal oil tanks, an oil fuel retorts room, a laboratory, offices, and stockrooms. The western portion of the site adjacent to the East River was vacant (Sanborn 1911 – 1917).

Circa 1925 to 1943 the Edward Smith Varnish Works continued to operate on the site. Stanley Barrel Corporation, a barrel manufacturer, occupied the former Barber Asphalt Company facility. The Kelly Dry Ginger Ale Corporation and the Harlem Chemical Company, manufacturers of insect exterminator fluid, occupied the former Blau Gas Company of America facility. The Crest Supply Corporation, a plumbing supply company, existed on present-day 48th Avenue. The western portion of the site adjacent to the East River was occupied by the Liquid Carbonic Corporation (LCC). The LCC facility included a liquor house, a drum house, and a coke bin. A rail spur existed on the southwestern corner of the property. The spur crossed present-day 48th Avenue and entered the Long Island Rail Road (LIRR) Freight Yard located on the adjoining present-day 48th Street. The dock that previously existed at the site near present-day 47th Road had been removed (Sanborn 1925 - 1943).

In the late 1940s (circa 1947 to 1949), the varnish works, carbonic works, and plumbing supply manufacturer remained at the site. A chemical manufacturing facility and refrigerator equipment manufacturing facility operated on 48th Avenue. An auto repair business occupied the former ginger ale manufacturing facility, and a “Shelling Manufacturer” was operating in the former insecticide manufacturing facility (Sanborn 1947 – 1949).

As of 1998, the site had become a part of a larger development by the Port Authority of New York and New Jersey and the State of New York called the Queens West Development Corporation, a subsidiary of the Empire State Development Corporation. The project extended from the Anable Basin to 50th Avenue and west of 5th Street. The Queens West Development Corporation planned a public park, residential housing, retail space, and

improved sewer and public utilities, as well as public schools and a public library (QWDC 2011). Block 19, Lot 19 is currently filled with the Avalon Riverview North Building at 4-75 48th Avenue. It has 570,000 square feet, 602 apartments, and more than 39 floors (QueensWest.com 2011).

## **7 CURRENT AND HISTORICAL AREAS OF CONCERN AND COPCs**

The current understanding of the historical and current potential upland and overwater areas of concern at the site is summarized in Table 1. The following sections provide brief discussion of the potential sources and COPCs at the site requiring additional discussion.

Potential historical and current contaminant sources at the facility include USTs and manufacturing and processing areas (including chemical, varnish, asphalt, and insecticide). The COPCs associated with these sources include VOCs, semi-volatile organic compounds (SVOCs), metals, pesticides, polychlorinated biphenyls (PCBs), and petroleum hydrocarbons. A 2010 Decision Document for Voluntary Cleanup identified the following COPCs: chrysene, benzene, toluene, ethylbenzene, xylene (mixed), naphthalene, and benzo(a)pyrene (Cozzy 2010).

### **7.1 Uplands**

The entire site is considered an area of concern due to the material leaked from former manufacturing operational areas. The contaminant distribution suggests that the release history was one of continual leaks to the subsurface above the water table (Cozzy 2010).

The NYSDEC database lists 22 USTs for PBS No. 2-609907 and 6 USTs for PBS No. 2-611726. It is not known when these tanks were installed but all 28 have been closed and/or removed. Petroleum product storage and capacity of the USTs is summarized in the following table (EDR 2010; NYSDEC 2012a):



Tank ID	Tank Status	Capacity (Gallons)	Product
<b>PBS No. 2-609907</b>			
1	Closed – Removed 03/25/05	10,000	Not reported
2	Closed – Removed 03/25/05	10,000	Not reported
3	Closed – Removed 03/25/05	10,000	Not reported
4	Closed – Removed 09/16/05	2,000	Gasoline
5	Closed – Removed 11/10/05	550	Gasoline
6	Closed – Removed 11/10/05	4,000	Diesel
7	Closed – Removed 11/10/05	4,000	Diesel
8	Closed – Removed 11/09/05	550	Other
9	Closed – Removed 02/08/05	1,500	Other
10	Closed – Removed 02/13/06	800	Gasoline
11	Closed – Removed 02/16/06	800	Gasoline
12	Closed – Removed 02/21/06	2,500	Gasoline
13	Closed – Removed 02/21/06	2,500	Gasoline
14	Closed – Removed 02/21/06	2,500	Gasoline
15	Closed – Removed 02/21/06	2,000	Gasoline
16	Closed – Removed 02/24/06	400	Gasoline
17	Closed – Removed 05/11/06	3,000	Kerosene (No. 1 fuel oil)
18	Closed – Removed 05/11/06	3,000	Kerosene (No. 1 fuel oil)
19	Closed – Removed 05/24/06	1,200	No. 4 fuel oil
20	Closed – Removed 05/25/06	1,500	No. 4 fuel oil
21	Closed – Removed 05/25/06	1,500	No. 4 fuel oil
22	Closed – Removed 05/25/06	3,000	No. 4 fuel oil
<b>PBS No. 2-611726</b>			
015	Closed – In place 12/19/07	1,000	No. 2 fuel oil
100	Closed – Removed 11/14/11	550	No. 2 fuel oil
101	Closed – Removed 11/18/11	30	Hydraulic oil
102	Closed – Removed 11/18/11	30	Hydraulic oil
103	Closed – Removed 11/29/11	550	Diesel
104	Closed – Removed 11/29/11	750	No. 2 fuel oil

## Notes:

ID – identification

No. – number

PBS – Petroleum Bulk Storage

## **7.2 Overwater Activities**

This site is not adjacent to Newtown Creek or associated waterways. Information regarding overwater activities on the creek was not identified in documents available for review.

## **7.3 Spills**

Documented spills at the site are summarized as follows:

- On April 10, 2010, an unknown petroleum release occurred from an unknown source at Center Boulevard and 47th Road (NYSDEC Spill No. 1000420). The file was closed by NYSDEC on April 12, 2010 (NYSDEC 2012a).
- On August 17, 2010, a 10-gallon hydraulic oil release occurred from a commercial vehicle equipment failure (NYSDEC Spill No. 1005513). The file was closed by NYSDEC the same day (NYSDEC 2012a).

# **8 PHYSICAL SITE SETTING**

## **8.1 Geology**

Bedrock in the vicinity of the site is approximately 30 to 40 feet bgs and declines steeply to approximately 50 to 60 feet bgs, as it approaches the East River (Fleming 2010a). Overlying the bedrock is a layer of glacial till up to 30 feet thick, consisting of compact fine to coarse sand and silt with some gravel, silt, clay, and boulders (Fleming 2010a). Beneath the site the till surface forms a northwest trending trough, a localized depression, leading to the East River. Beneath Center Boulevard, the till surface forms a narrow but deep north-northeast trending trough. Atop the till is a layer of alluvial sand consisting of sand and silt up to 17 feet thick (Fleming 2010a). Within this stratum are intermittent layers of peat and silt, approximately 10 feet thick, which are thought to be the surface of the marsh deposits that were filled in to reclaim land from the East River. Overlying the alluvial sand and silt and peat deposits, and extending across the surface of Parcel 8 site, is a layer of imported fill that is approximately 10 to 12 feet thick and up to 34 feet in places (Fleming 2010a). A geologic cross-section of Parcel 8 is included as Attachment 3.

## 8.2 Hydrogeology

Groundwater exists beneath the site at approximately 8 to 10 feet bgs and generally flows west across the site toward the East River (Fleming 2010a). However, groundwater beneath Center Boulevard flows south and east and is thought to be influenced by the sewer lines, steel sheeting, and other subsurface infrastructure that run the length of the site.

Groundwater contour maps are included as Attachment 4 (Fleming 2010a). Horizontal hydraulic gradients calculated during site investigations ranged from 0.0014 to 0.0032 feet by feet in the shallow zone and averaged 0.0016 feet by feet in the deep zone (Fleming 2010a).

The net vertical hydraulic gradient in the area is downward, from the shallow to the deeper groundwater zone. This was evident in 3 out of 16 wells measured during both high- and low-tide conditions. The average vertical gradient measured 0.02 feet by feet. The ratio of horizontal to vertical gradient is slightly less than 10 horizontal to 1 vertical. Three well pairs exhibited an upward gradient, localized to Center Boulevard (Fleming 2010a).

Hydraulic conductivity, based on slug tests, in the shallow groundwater zone ranged from  $8.1 \times 10^{-5}$  centimeters per second to  $1.2 \times 10^{-4}$  centimeters per second and averaged  $1.1 \times 10^{-4}$  centimeters per second. In the deep groundwater zone this parameter ranged from  $8.1 \times 10^{-5}$  centimeters per second to  $2.0 \times 10^{-3}$  centimeters per second and averaged  $6.1 \times 10^{-4}$  centimeters per second. On average, hydraulic conductivity in the shallow groundwater zone was approximately six times greater than in the deeper zone (Fleming 2010a).

Seepage velocity, using effective porosities for medium and coarse sands of 0.1 to 0.3 ranged from  $9.4 \times 10^{-7}$  centimeters per second to  $1.4 \times 10^{-6}$  centimeters per second and averaged  $1.2 \times 10^{-6}$  centimeters per second in the shallow groundwater zone. In the deeper groundwater zone, seepage velocity ranged from  $6.5 \times 10^{-7}$  centimeters per second to  $1.6 \times 10^{-5}$  centimeters per second and averaged  $4.8 \times 10^{-6}$  centimeters per second (Fleming 2010a).

## 9 NATURE AND EXTENT (CURRENT UNDERSTANDING OF ENVIRONMENTAL CONDITIONS)

Site investigations on or adjacent to the site occurred in 1985 to 1986, 1989, 1994, 1998, 2006, and 2008 to 2009. The first two investigations were performed as part of an overall assessment of the subsurface conditions throughout the Queens West development site. The 1994 investigation focused on subsurface conditions along the route of proposed underground utilities on south-adjacent parcels and the west-adjacent waterfront park. The 1998 investigation was requested by NYSDEC in order to address issues raised by the previous testing programs and the proposed development of the site and adjacent parcels (Fleming 2010a).

In July 2006, Allee King Rosen & Fleming, Inc. (AKRF), completed an investigation of Parcel 9 under the BCP by performing off-site sampling of soils and groundwater, as described in a report entitled *Off-Site Investigation Report, Queens West Development-Parcel 9* (Parcel 8 and the Center Boulevard VCP site is considered the off-site area to Parcel 9). The investigation included soil borings, groundwater sampling, and fluid-level monitoring. Soil borings and monitoring wells extended to the top of the till layer, and the investigation focused on the previously identified coal tar dense nonaqueous phase liquid (DNAPL) atop the till layer. Part of Parcel 8 was not investigated because of access limitations imposed by a construction and demolition (C&D) pile that covered the majority of that site. Off-site soil-gas sampling results were also included in this report (Fleming 2010a).

From October 2008 to November 2009, Arnold Fleming P.E. and Fleming Lee Shue, Inc. (FLS), conducted a remedial investigation (RI) of Center Boulevard as part of the off-site area (OSA) investigation. The work plan for this investigation was developed to respond to data gaps identified by the 2006 AKRF investigation and a site investigation conducted by FLS. During the RI, soil-gas, soil, and groundwater samples were collected from Peninsula Park & Gantry Plaza State Park, Center Boulevard, and the 48th Avenue-Center Boulevard intersection. The following sections discuss results of the site investigations (Fleming 2010a).

### 9.1 Soil

Soil Investigations

☒ Yes ☐ No

Bank Samples

☐ Yes ☐ No ☒ Not Applicable

Soil-Vapor Investigations

☐ Yes ☒ No

### 9.1.1 Soil Investigations

In 1985 soil samples were collected throughout the site. Samples were collected using split-spoon samples and were analyzed for petroleum hydrocarbons, PCBs, extraction procedure (EP) toxicity, and reactivity for cyanide and sulfide. Only one sample (collected near the intersection of 47th Road and 5th Street) exceeded the RCRA EP toxicity characteristic for mercury at 0.56 parts per million (ppm). PCBs were detected in some samples at low levels. Total petroleum hydrocarbons (TPHs) ranged from 1,758 to 6,659 ppm (AKRF 1995). No information on sampling depth or quality assurance/quality control (QA/QC) was presented (Fleming 2008).

Additional soil sampling occurred at the site in 1989. Soil samples were analyzed for Target Compound List (TCL) VOCs and SVOCs, PCBs, Target Analyte List (TAL), and EP toxicity. Results identified SVOCs in the majority of the samples, with total SVOCs ranging from non-detect (ND) to 8,000 ppm. The highest polycyclic aromatic hydrocarbon (PAH) was 728 ppm. Significant levels of VOCs were only detected in one sample. The total VOC concentration in this sample was 8 ppm. TPHs ranged from 19 to 7,980 ppm (AKRF 1995). In 1994, limited additional investigation of surface soils was performed immediately to the west of Parcel 8, in the area that later became Peninsula Park. The investigation consisted of collecting discrete surficial soil samples from 0 to 2 feet below grade. Soil samples were subsequently composited into two samples and analyzed for TCL SVOCs, PCBs, and RCRA characteristic waste parameters (ignitability, corrosivity, reactivity, and toxicity using toxic characteristic leaching procedure [TCLP]). Analytical results indicated that surficial soil had none of the hazardous waste characteristics and did not contain detectable concentrations of PCBs. However, the laboratory analysis of the soil samples identified elevated levels of PAHs (Fleming 2008).

In 1998, an investigation was conducted to confirm the absence of hazardous levels of mercury on the site, determine the nature and extent of solvent contamination, and delineate the extent of petroleum and PAH contamination. Results show that levels of PAHs in the

shallow and subsurface soil were consistent with those found on other parcels. The maximum concentration of total PAHs was 1,743 ppm in sample B/MW-9A (3 to 5 feet bgs). Prior sampling in 1994 on Parcel 10 indicated total PAH levels in the subsurface and shallow soils range from 7.6 to 4,348 ppm. Leachable lead exceeded the maximum concentration for the characteristic of toxicity at three locations. Trace concentration of pesticides, TCL VOCs, and PCBs were also detected (Fleming 2008). Soil borings and sample locations from the 1998 are included in Attachment 5.

The July 2006 Parcel 9 soil investigation, which included Parcel 8 and the Center Boulevard VCP site, identified DNAPL in soil samples primarily collected from the saturated zone just atop the low permeability silt/clay till layer at approximately 27 to 37 feet bgs (Fleming 2010a).

During the 2009 Parcel 8 RI, FLS advanced ten soil borings in Peninsula Park/Gantry Plaza State Park, nine borings in Center Boulevard, and three borings in the 48th Avenue-Center Boulevard intersection area, using hollow stem augers (HSAs) and 2-foot-long, steel, split-spoon samplers. Soil borings were advanced to depths of approximately 25 to 37 feet bgs, to the confining till layer. Grab samples were collected from each soil boring at varying depths and analyzed for PCBs, VOCs, SVOCs, metals, diesel range organics, and gasoline range organics. Soil sampling results are summarized in Attachment 6. Multivariate plots of contaminant type and a plate view of contaminated areas are included as Attachments 7 and 8 (Fleming 2010a).

Benzene, ethylbenzene, and toluene concentrations were below their respective Part 375 Commercial Use Soil Cleanup Objectives (SCOs). Two samples for xylenes exceeded the SCO of 555,000 µg/kg in AKRF samples QW-SB-20(28-30) and QW-SB-21(20-22). VOC concentrations exceeded the SCO in several samples. Chlorinated compounds were generally not detected, and in the few instances where they were detected, concentrations were below SCOs (Fleming 2010a).

SVOCs were reported at concentrations above the SCOs in several soil borings at varying depths. The SVOCs reported above the SCOs are the PAHs, which are combustion products and typical components of historic urban fill, but are also components of products such as

fuel oils, coal tar, and creosote. There was no distinct soil type or corresponding DNAPL observations associated with the elevated concentrations of these compounds. Elevated concentrations occurred in samples with either coarse sands or silty soils and in samples containing either DNAPL or coal fragments. The lack of clear association suggests that these compounds and other PAHs are associated with both coal tar or the coal or petroleum combustion that were used extensively in the area for many decades. The locations of carcinogenic PAHs (cPAH)s and other SVOC exceedances on the site are scattered, showing no apparent pattern (Fleming 2010a).

The following metals exceeded the SCOs: 1) arsenic (SCO of 16 milligrams per kilogram [mg/kg]) in two samples; and 2) mercury (SCO of 2.8 mg/kg) in one sample. Other toxic metal results were below the SCOs (Fleming 2010a).

Only one soil sample exceeded the SCO for PCBs. No samples exceeded the SCO for pesticides (Fleming 2010a). Select minimum and maximum soil concentration are summarized in the following table for constituents that exceeded the respective SCO criteria (Fleming 2010a):

Analyte	Units	Minimum Soil Concentration	Maximum Soil Concentration	Number of Exceedances
Benzene	mg/kg	ND	160	2
Benz(a)pyrene	mg/kg	ND	84	63
Dibenzo(ah)anthracene	mg/kg	ND	5,430	63
Naphthalene	mg/kg	ND	4,730	17
Arsenic	mg/kg	ND	45.5	8
Lead	mg/kg	2.9	1,220	1
Mercury	mg/kg	ND	6.6	7

Notes:

mg/kg – milligram per kilogram

ND – not detected

### 9.1.2 Soil-Gas Samples

Exploration Technologies, Inc. (ETI), of Houston, Texas, advanced 39 soil-gas points in Center Boulevard including the intersection with 48th Avenue (April 6 through 13, 2009). The purpose of this exploratory soil-gas sampling was to identify likely areas of subsurface

nonaqueous phase liquid (NAPL) and contaminant mass in order to guide the placement of soil borings for a more targeted subsurface investigation. The results of the soil-gas survey conducted as part of the RI indicated very low concentrations of chlorinated solvents, mainly perchloroethylene (PCE) and 1,1,1-trichloroethane, with only traces of other measured chlorinated solvents (Fleming 2010b, Appendix G of the Off-site RIR), in a pattern that suggests localized independent spills. ETI's sampling found the site free of significant chlorinated soil-gas plumes or degradation indicative of chlorinated source contamination (Fleming 2010a).

The soil-gas survey found concentrations of methane suggestive of natural decomposition of hydrocarbon contaminants. In Center Boulevard, methane concentrations ranged from 1.6 parts per million by volume (ppmv) to 49,244 ppmv (4.9 percent), with 90 percent of the methane measurements being 477 ppmv (0.05 percent) or less. The C5+<sup>1</sup> soil-gas concentrations are greater in Center Boulevard than in the Parks. In combination with the methane, the higher C5+ concentrations indicate that the material beneath Center Boulevard is less degraded due to more anaerobic conditions under the road (Fleming 2010a). Soil-gas results are shown on Attachment 9.

### 9.1.3 Soil Summary

The 2008/2009 investigation identified soil contamination (creosote and coal tar products) beneath Center Boulevard extending from the top of the water table to the confining till layer approximately 30 feet below grade (Fleming 2010a). The Parcel 8 RI findings indicated that a contaminant mass (primarily consisting of SVOCs) occupied the interval from the top of the water table to approximately 24 feet bgs. Benzene, toluene, ethylbenzene, and xylene (BTEX), petroleum compound, and chlorinated compounds were detected in relatively low concentrations in the shallow, unsaturated soils above the water table.

## 9.2 Groundwater

Groundwater Investigations

☒ Yes ☐ No

NAPL Presence (Historical and Current)

☒ Yes ☐ No

<sup>1</sup> Organic compounds with 5 or more carbon atoms



Dissolved COPC Plumes

☒ Yes ☐ No

Visual Seep Sample Data

☐ Yes ☐ No ☒ Not Applicable

### 9.2.1 Groundwater Investigations

Groundwater samples collected during the 1985 investigation were analyzed for 129 priority pollutants, chemical oxygen demand, total organic carbon, biochemical oxygen demand, and total dissolved solids. Results include exceedances of the Division of Water Technical Operational and Guidance Series (TOGS) 1.1.1 Class GA Ambient Water Quality Standards (AWQS) for acenaphthene, bis (2-ethylhexyl) phthalate, phenols, benzene, ethylbenzene, toluene, arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc.

Concentrations of petroleum hydrocarbons ranged from not detected (ND) to 8,500 ppm (AKRF 1995). It should be noted that no information on sampling depth or QA/QC was presented (Fleming 2008).

Analysis of groundwater samples collected during the 1989 site investigation included exceedances of the Class GA AWQS for acenaphthene, benzene, toluene, m-xylene, methylene chloride, arsenic, barium, chromium, copper, lead, manganese, mercury, sodium, and zinc (AKRF 1995).

During the 1994 investigation, unfiltered groundwater samples were collected from two sample locations: near Center Boulevard at 48th Avenue and near Center Boulevard at 47th Road. Samples were analyzed for VOCs and total and dissolved metals. Results included exceedances of Class GA AWQS for ethylbenzene, total xylenes, arsenic, chromium, lead, mercury, and zinc (AKRF 1995).

In 1998, groundwater samples were collected from monitoring wells located in the open areas of the site and in the western-most warehouse building (4-65 48th Avenue) and analyzed for VOCs and BTEX. No light nonaqueous phase liquid (LNAPL) was observed in the monitoring wells. Elevated concentrations of BTEX and naphthalene were identified in groundwater samples collected from B/MW-8A and B/MW-9A. The source of these contaminants was thought to be USTs located beneath existing buildings. The elevated groundwater concentrations were reported as NYSDEC Spill No. 97-12929 (Fleming 2010a).

During the 2006 investigation of Parcel 9 five monitoring wells were installed on Parcel 8 and in the OSA sidewalk along Center Boulevard. The wells were screened from approximately 15 to 30 feet bgs, near the top of the till layer. Depth to groundwater ranged from approximately 8 to 11 feet bgs. VOC concentrations exceeded the Class GA AWQS. BTEX concentrations were highest near the southern portion of the site. SVOCs, including naphthalene, exceeded the AWQS (Fleming 2010a).

During the 2009 RI, FLS installed 12 monitoring wells in Peninsula Park (MW-24 to 30, shallow and deep), 11 in the Center Boulevard VCP (MW-32 to 36, shallow and deep, and MW-39, deep), and 4 in the 48th Avenue-Center Boulevard intersection (MW-31, shallow and deep, and MW-47, shallow and deep) to characterize both the shallow and deep water-bearing strata and to assess where contaminant impacts were the greatest. Shallow wells were screened to total depths of 13 to 20 feet bgs, and deep wells were screened to total depths of 27 to 35 feet bgs. A total of 41 groundwater samples were collected from the monitoring wells. The samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals, pesticides, and PCBs (Fleming 2010a). Attachment 10 includes groundwater sample locations and results (Fleming 2010b).

Concentrations of VOCs (specifically BTEX), SVOCs, primarily PAHs, phenol and methylated-phenol variants, arsenic, and lead exceeded TOGS criteria. In most cases, VOCs exceeded the TOGS criteria by one to three orders of magnitude. Samples collected from monitoring wells located near the southwest corner of Parcel 8 contained the highest BTEX concentrations. BTEX concentrations in samples collected from the deeper wells were generally higher than concentrations in samples collected from the shallow wells. The highest BTEX concentrations existed in samples collected between 27 and 32 feet bgs, which is slightly deeper than on Parcel 9, where the highest BTEX concentrations existed in samples collected between 18 and 24 feet bgs (Fleming 2010a).

Selected groundwater sampling results from the 2009 RI (including samples collected from the Peninsula Park Center Boulevard VCP and the 48th Avenue-Center Boulevard intersection) are summarized in the following table (Fleming 2010a):

Analyte	Units	Minimum GW Concentration	Maximum GW Concentration	Location of Max Concentration
Benzene	µg/L	ND	55,700	PP/GP
Toluene	µg/L	ND	20,900	PP/GP
Ethylbenzene	µg/L	ND	1,540	PP/GP
Xylene (total)	µg/L	ND	6,390	PP/GP
Total BTEX	µg/L	ND	83,740	PP/GP
MTBE	µg/L	ND	206	PP/GP
PCE	µg/L	ND	6.5	PP/GP
Acenaphthene	µg/L	1.5	505	48th A-CB Int.
Naphthalene	µg/L	47.6	16,900	CB VCP
Arsenic	µg/L	ND	49	CB VCP
Lead	µg/L	ND	85.6	PP/GP

## Notes:

µg/L – microgram per kilogram

BTEX – benzene, toluene, ethylbenzene, and xylene

MTBE – methyl tert-butyl ether

ND – not detected

PCE – perchloroethylene

PP/GP – Peninsula Park and Gantry Plaza

48th A-CB Int. – 48th Avenue-Center Boulevard intersection

CB VCP – Center Boulevard Voluntary Cleanup Program

### 9.2.2 NAPL (Historical and Current) Presence

The physical properties of the DNAPL collected from well MW-26 and a groundwater sample collected from the same well include the following:

Matrix	Specific Gravity	Density (g/cm <sup>3</sup> )	Kinematic Viscosity (cs)	Dynamic Viscosity (cp)	Interfacial Tension (dynes/cm)
Groundwater	1.005	1.004	1.21	1.21	69.8
NAPL	1.101	1.1	30.1	33	--
NAPL-air	--	--	--	--	47.3
NAPL-water	--	--	--	--	5.6
Pure water (20°C)	0.998	0.998	1	1	72.0

## Notes:

Source – Fleming 2010a

-- – physical property not available

°C – degrees Celsius

cm – centimeter

cm<sup>3</sup> – cubic centimeter

cp – centipoise

cs – centistoke

g – gram

NAPL – non-aqueous phase liquid

The combination of density and viscosity put the DNAPL in the coal tar/creosote range based on the comparison of various DNAPLs (Fleming 2010a).

### 9.2.3 Dissolved Contaminant Plume

The results of the Parcel 8/Center Boulevard RI indicate that the creosote/coal tar groundwater plume exists beneath the site. Petroleum-contaminated groundwater exists in some portions of the site (Fleming 2010a). Two source areas have been identified on the site: a lighter coal tar material centered near the southwest corner of Parcel 8 and a heavier coal tar material that exists beneath Center Boulevard and Gantry Plaza State Park (Fleming 2010a).

### 9.2.4 Groundwater Summary

Groundwater at the site is impacted by creosote and coal tar product contamination and contains elevated levels of BTEX compounds, phenol, and PAHs. Dissolved BTEX concentrations are highest near areas with the greatest amount of contaminant mass and decrease with increasing distance from those areas. DNAPL within this area is immobile and occurs as a residual only (Fleming 2008).

## 9.3 Surface Water

Surface Water Investigation

SPDES Permit (Current or Past)

Industrial Wastewater Discharge (IWD) Permit (Current or Past)

Stormwater Data

Catch Basin Solids Data

Wastewater Data

☐ Yes ☒ No

☐ Yes ☒ No

☐ Yes ☒ No

☐ Yes ☒ No

☐ Yes ☒ No

☐ Yes ☒ No

### 9.3.1 Stormwater and Wastewater Systems

This site is within the Bowery Bay WPCP sewershed. Stormwater at the site is expected to drain directly to the East River (based on topography) or flow into combined sewer systems. Wastewater discharges from the site flow into a combined sewer system. When the combined flows exceed the system's capacity, untreated CSOs are discharged to the East River.

### 9.4 Sediment

Creek Sediment Data

☐ Yes ☐ No ☒ Not Applicable

The site is not adjacent to Newtown Creek and information related to sediment sampling was not found in reviewed documents.

### 9.5 Air

Air Permit

☐ Yes ☒ No

Air Data

☐ Yes ☒ No

The Community Air Monitoring Program (CAMP) collected data during the RI activities. Ambient air samples collected near Center Boulevard at Peninsula Park and Parcel 8 were analyzed and the results were compared to background samples (i.e., samples collected in the neighboring streets, residential areas, neighborhoods, and parks). Concentrations of VOCs, BTEX, naphthalene, acetone, PCE, methyl ethyl ketone (MEK), and methylene chloride in the samples collected from the site were similar to those in the background samples. Total xylene concentration in Peninsula Park ambient air was marginally higher than the ambient air results for this compound in the surrounding area (Fleming 2010a).

## 10 REMEDIATION HISTORY (INTERIM REMEDIAL MEASURES AND OTHER CLEANUPS)

In February 2001, soil contaminated with mercury (concentrations above 23 mg/kg) was removed and endpoint samples were collected. A UST and petroleum-impacted soils were also removed. Approximately 320 tons of soil were disposed of off site (Fleming 2008 and

2010a). Attachment 11 presents a figure of the removal area and includes endpoint sample results and locations.

A Remedial Action Work Plan (RAWP) was developed for the site in November 2010. Review of the available information has not confirmed if this RAWP has been implemented or completed. A search of Brownfield site certificates of completion did not list Center Boulevard (NYSDEC 2012b).

## **11 BIBLIOGRAPHY/INFORMATION SOURCES**

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## 12 ATTACHMENTS

### Figures

Figure 1                      Site Vicinity Map: Queens West (Hunters Point) Center Boulevard

### Tables

Table 1                      Potential Areas of Concern and Transport Pathways Assessment

### Supplemental Attachments

Attachment 1              Tax Lot Map (NYCDCP 2011)

Attachment 2              Figure 3: Site Plan (Fleming 2008)

Attachment 3              Figure 8A: Geologic Cross Sections A&B (Fleming 2010a)

Attachment 4              Figures 9A, 9B and 9C: Groundwater Contour Map-Shallow wells,  
Groundwater Contour Map-Deep Wells and Vertical Groundwater  
Contour Map (Fleming 2010a)

Attachment 5              Figures 4A, 4B and 4C: Sampling Locations from Previous  
Investigations

Attachment 6              Figure 7: Parcel 8+ Off-Site Areas Soil Sample Results Summary  
(Fleming 2010a)

Attachment 7              Figure 15: Parcel 8+ Off-Site Areas Multivariate Plots of Contamination  
Types (Fleming 2010a)

Attachment 8              Figure 17: Parcel 8+ Off-Site Areas Plate Views of Contaminant Source  
Area (Fleming 2010a)

Attachment 9              Figure 16: Parcel 8 + Off-Site Areas Methane & C-5+ Soil Gas results  
(Fleming 2010a)

Attachment 10             Figures 11: Groundwater Sampling Results (Fleming 2010a)

Attachment 11             Figures 8, 9, and 10: VOCs in End-Point Soil Samples, SVOCs in End-  
Point Samples, Metals in End-Point Soil Samples (Fleming 2008)



**Table 1**  
**Potential Areas of Concern and Transport Pathways Assessment – Queens West (Hunter's Point) Center Boulevard**

Potential Areas of Concern	Media Impacted					COPCs													Potential Complete Pathway							
Description of Areas of Concern	Surface Soil	Subsurface Soil	Groundwater	Catch Basin Solids	Creek Sediment	TPH			VOCs			SVOCs	PAHs	Phthalates	Phenolics	Metals	PCBs	Herbicides and Pesticides	Dioxins/Furans	Overland Transport	Groundwater	Direct Discharge – Overwater	Direct Discharge – Storm/Wastewater	Discharge to Sewer/CSO	Bank Erosion	Air Releases
						Gasoline-Range	Diesel – Range	Heavier – Range	Petroleum Related (e.g., BTEX)	VOCs	Chlorinated VOCs															
Former USTs	--	?	?	?	?	√	√	√	√	?	?	?	?	?	?	?	?	?	?	--	?	--	--	--	--	?
Former Manufacturing/ Processing Areas	√	√	√	?	?	?	?	?	√	√	?	√	?	?	?	√	√	√	?	--	?	--	--	--	--	?

## Notes:

√ – COPCs are/were present in areas of concern having a current or historical pathway that is determined to be complete or potentially complete.

? – There is not enough information to determine if COPC is/was present in area of concern or if pathway is complete.

-- – Current or historical pathway has been investigated and shown to be not present or incomplete.

BTEX – benzene, toluene, ethylbenzene, and xylenes

COPC – constituent of potential concern

CSO – combined sewer overflow

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SVOC – semi-volatile organic compound

TPH – total petroleum hydrocarbon

UST – underground storage tank

VOC – volatile organic compound



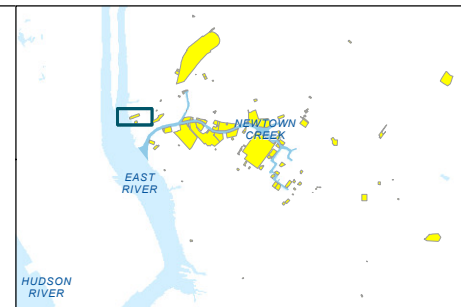
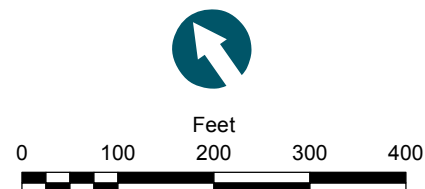


- USEPA Sample Locations (Surface and Subsurface)
- Shoreline (NYC Dept. of Information Technology, 2006)
- USGS Nat'l Elev. Dataset 5-foot Contours
- Selected Site Property Boundary
- Neighboring Site Property Boundary

- Outfall Class
- Direct Discharge
  - General
  - Highway Drain
  - Major Stormwater Outfall
  - SPDES
  - Storm Drain

**NOTES:**

1. Outfall Labeling: BB: Bowery Bay; NC(B/Q): Newtown Creek, Brooklyn/Queens; ST: Stormwater.
2. Outfall locations are preliminary, compiled, estimated data based on New York City Department of Environmental Protection (NYCDEP) maps and tabulated data and other resources. Many outfall locations were taken from the New York City Shoreline Survey Program: Newtown Creek Water Pollution Control Plant Drainage Area, NYCDEP, March 31, 2003. Other locations were taken from an excerpt from a similar report from 2008 (the complete report was not included in files available for review). Finally, some outfall locations were inherited from previous Anchor QEA and Newtown Creek Project work. Latitudinal and longitudinal data provided in the 2003 and 2008 NYCDEP reports were rounded to the nearest second. This resulted in potential outfall location discrepancies of up to approximately 200 feet. All outfall locations are currently under field verification.
3. Aerial Photos: New York State Division of Homeland Security and Emergency Services, 2010.
4. Site Boundaries are based on New York City parcels data.
5. Coarse topographic contours are derived from U.S. Geological Survey 10-meter data.





## SUPPLEMENTAL ATTACHMENTS

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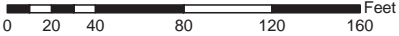
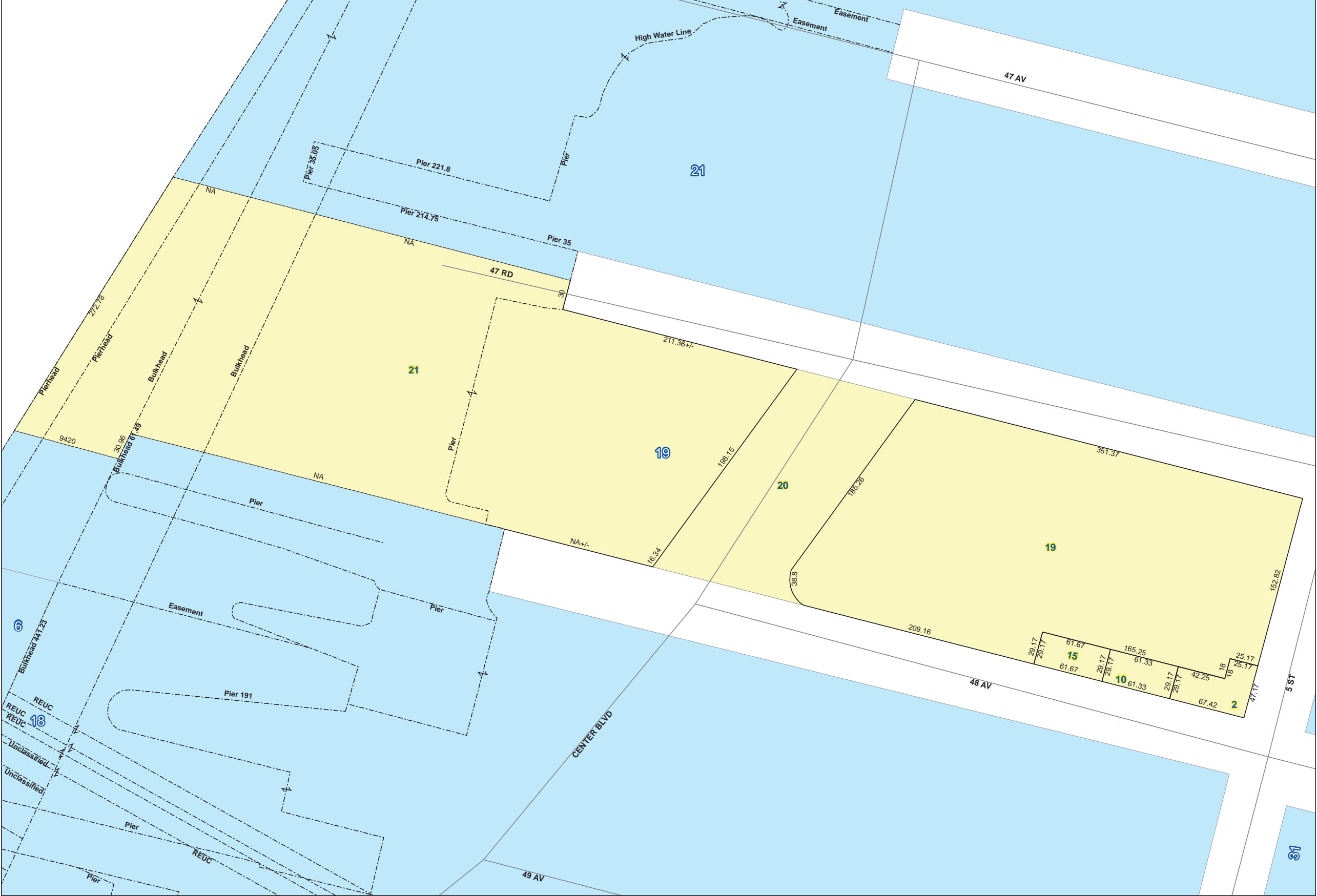
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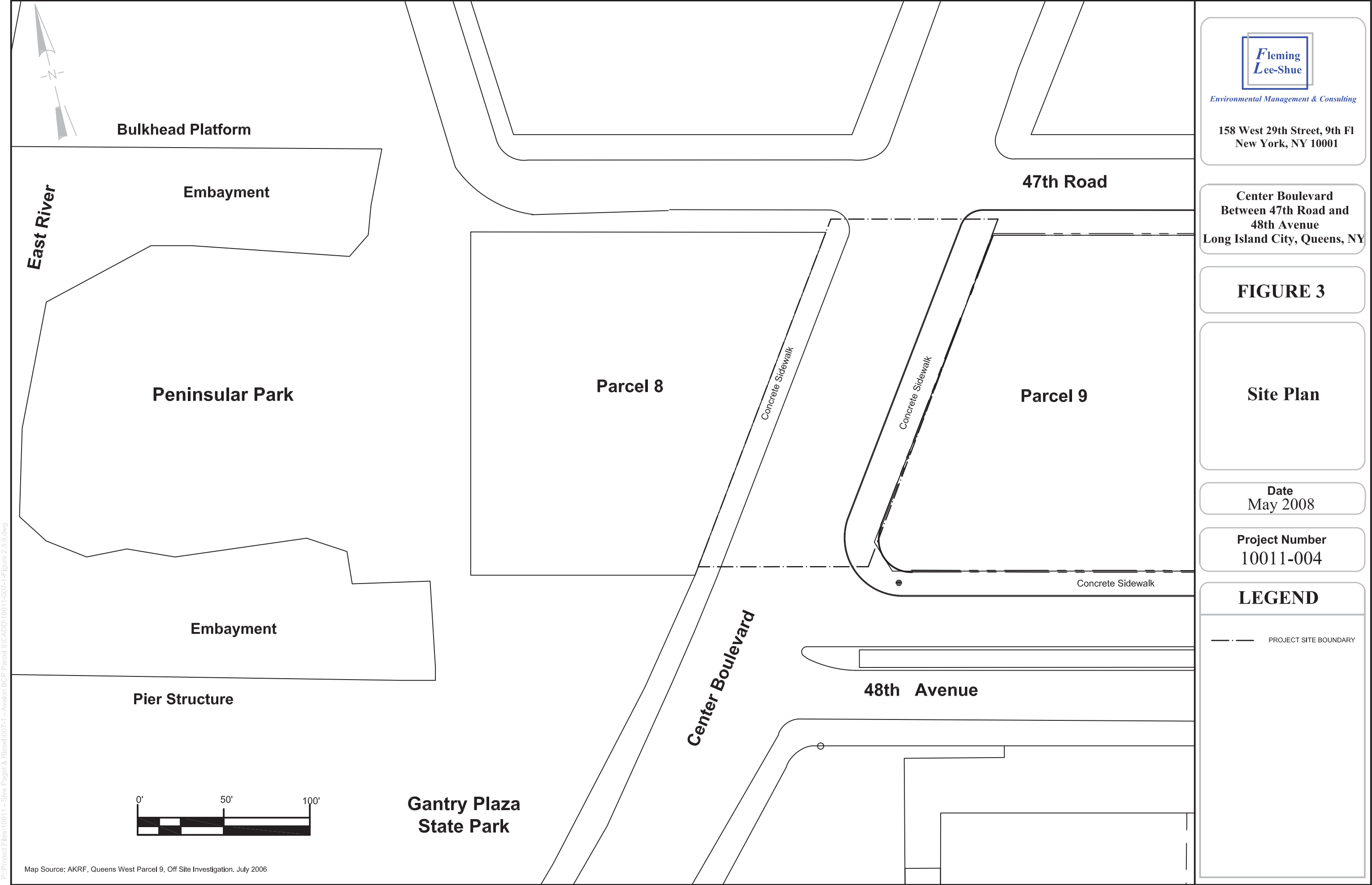
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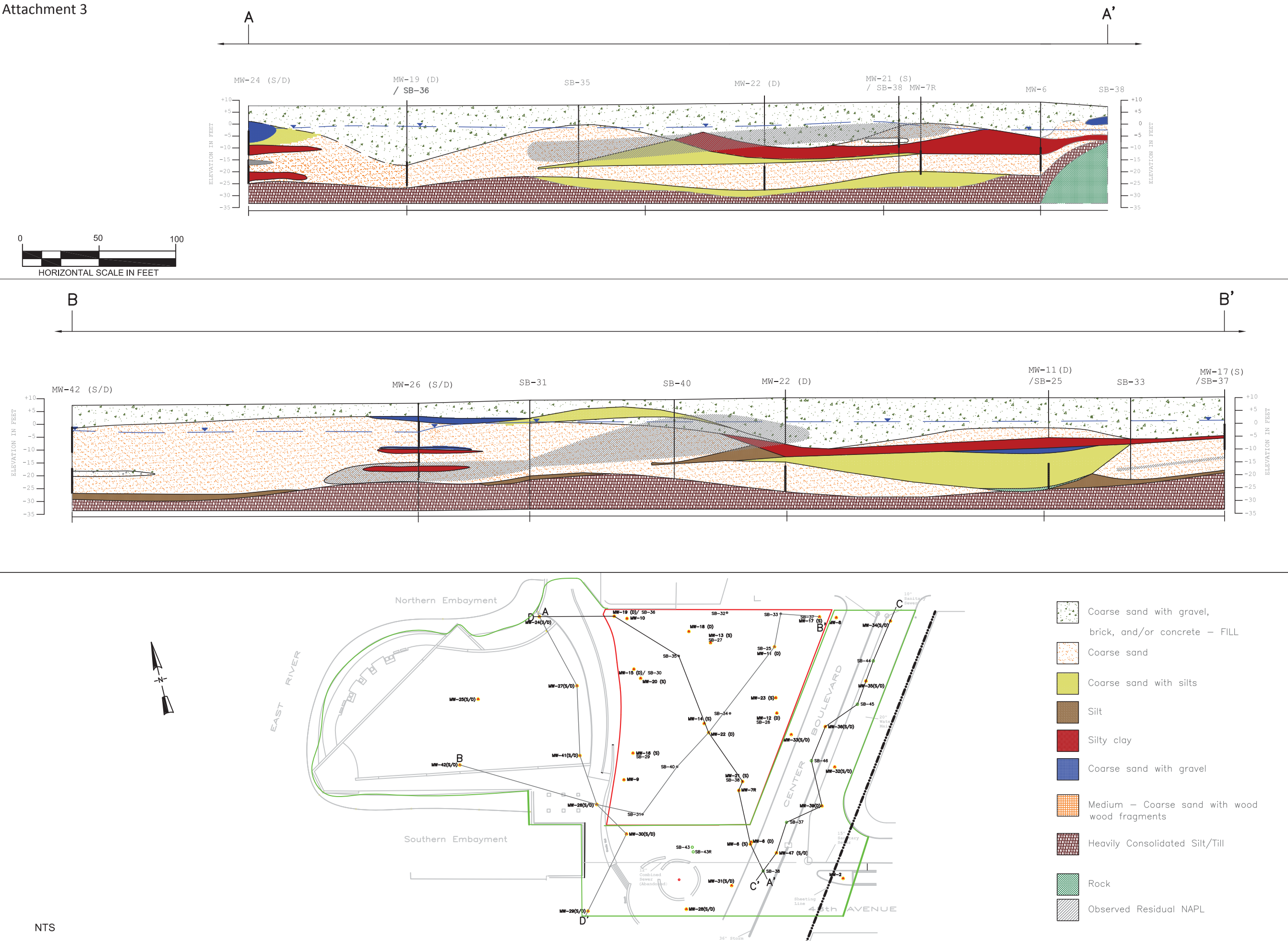


- Legend**
- Streets
  - Miscellaneous Text
  - Possession Hooks
  - Boundary Lines
  - Lot Face Possession Hooks
  - Regular
  - Underwater
  - Tax Lot Polygon
  - Condo Number
  - Tax Block Polygon





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New York, NY 10001

Queens West Development  
Parcel 8 & Off-Site Areas  
BCP Site No. C241087  
VCP Site No. V100194A

FIGURE 8A

# Geologic Cross Sections A & B

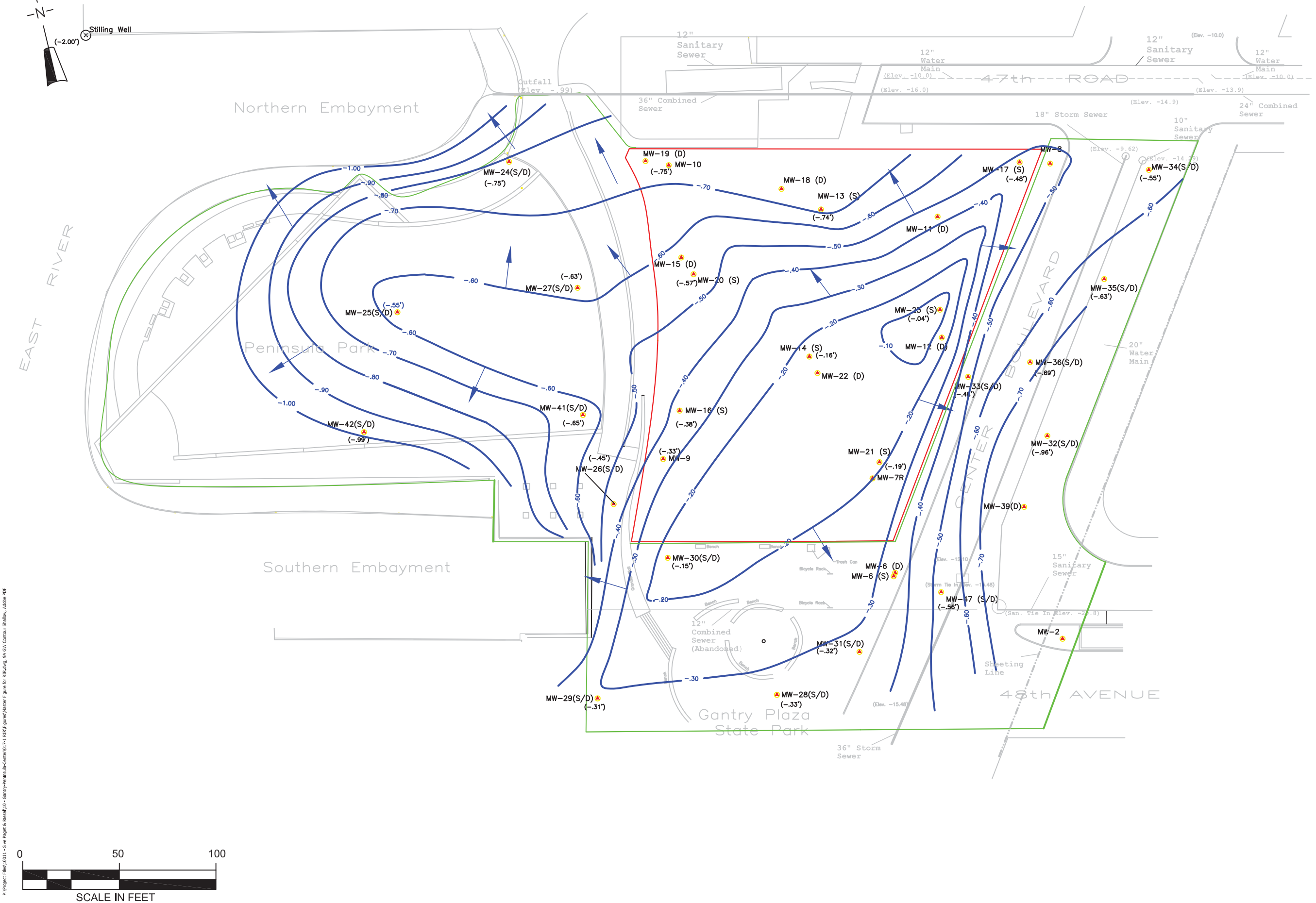
Date  
April 2010

Project Number  
10011-004-10

## LEGEND

- Groundwater Monitoring Well
- Parcel 8 / BCP Portion Boundary
- VCP Portion Boundary
- Groundwater elevations based on measurements collected from deep wells on October 5, 2009
- 2-inch diameter polyvinyl chloride (PVC) or steel well screen

NOTES:  
Elevations in reference to Borough of Queens Topographical Bureau Datum (QBD). Top of Well Casing (TWC) and land surface measurements surveyed by Monrose Surveying.



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Queens West Development  
Parcel 8 + Off-Site Area  
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VCP Site No. 10094A

FIGURE 9A

# Groundwater Contour Map - Shallow Wells

Date  
April 2010

Project Number  
10011-004-10

## LEGEND

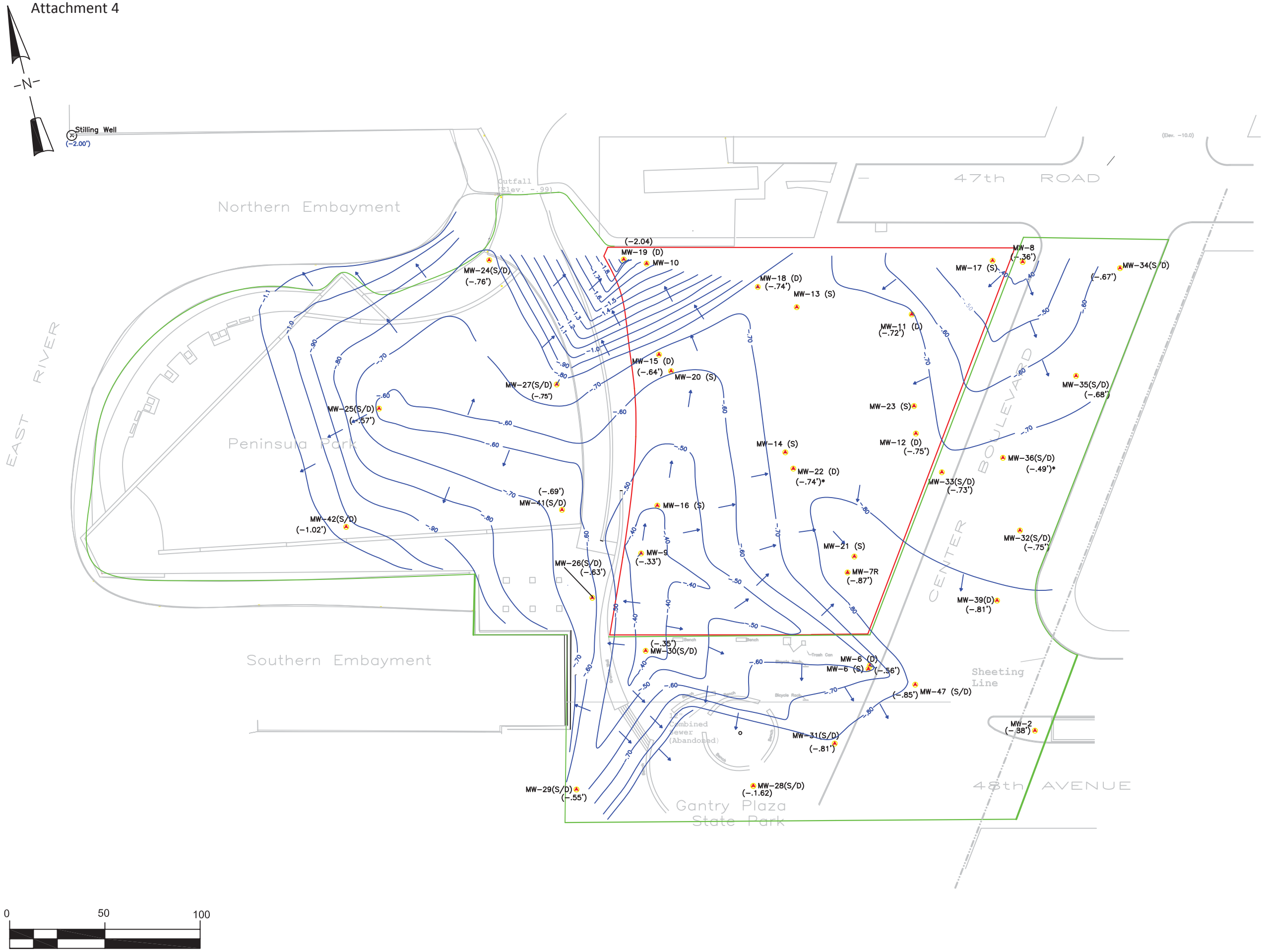
- Parcel 8 Boundary
- Off-site Investigation Area
- MW-7R Groundwater Monitoring Well
- (-0.52) Groundwater Elevation
- 0.40 Equipotential Elevation Line
- Groundwater Flow Direction

NOTES  
\* Not used for contour generation;  
spurious data

All groundwater elevations measured  
on October 5, 2009 and in reference  
to the Queens Topographical Bureau  
Datum







Fleming  
Lee-Shue

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Parcel 8 + Off-site Area  
BCP Site No. C241087  
VCP Site No. 10094A

FIGURE 9B

# Groundwater Contour Map - Deep Wells

Date  
April 2010

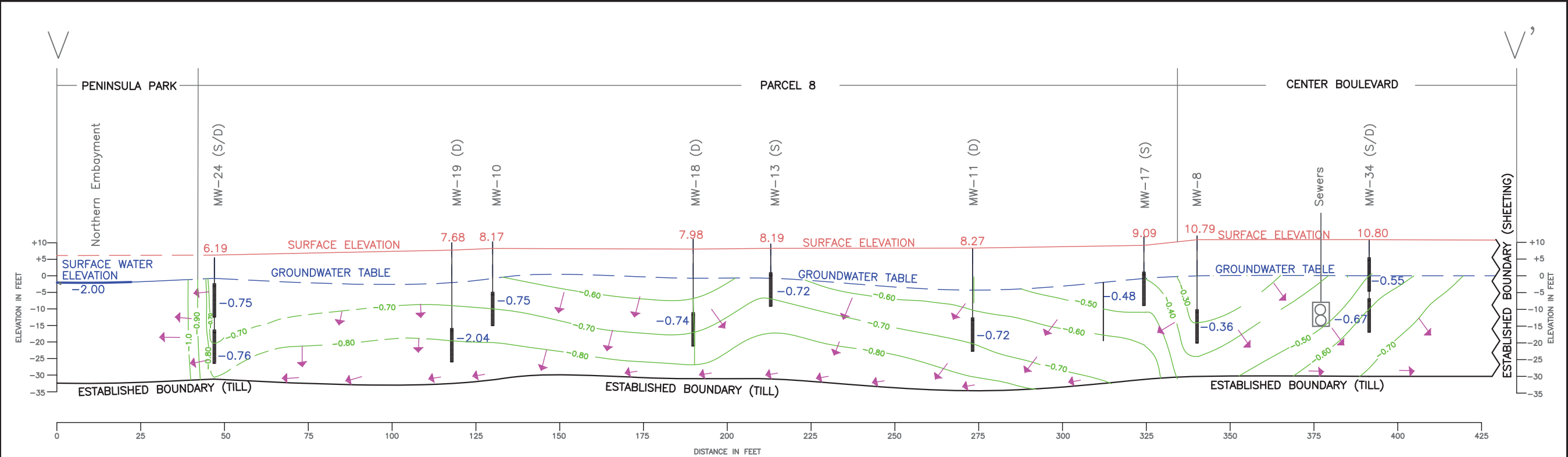
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## LEGEND

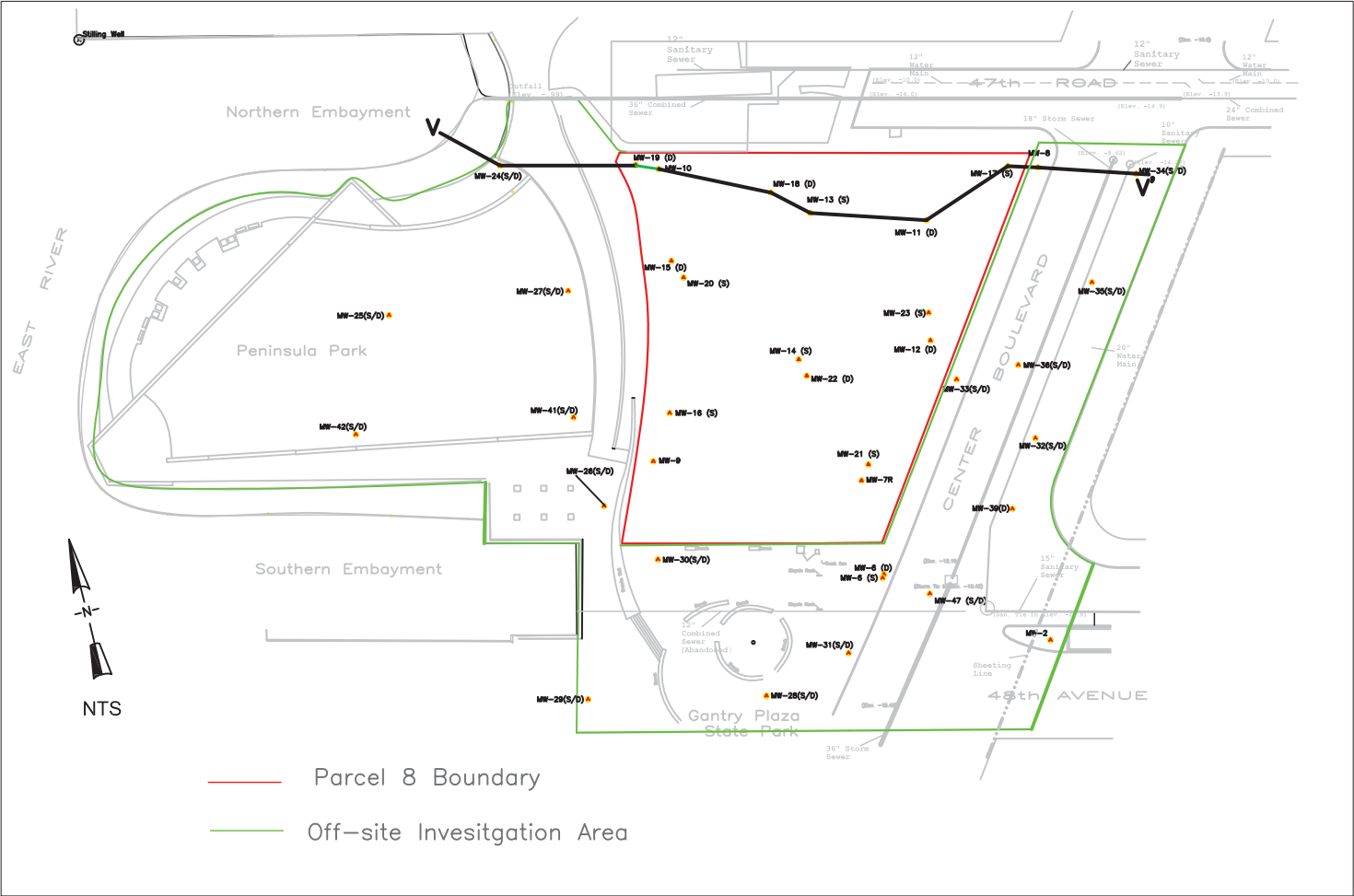
- Parcel 8 Boundary
- Off-site Investigation Area
- MW-7R Groundwater Monitoring Well
- (-0.52) Groundwater Elevation
- Equipotential Elevation Line
- Groundwater Flow Direction

NOTES  
\* Not used for contour generation;  
spurious data  
  
All groundwater elevations measured  
on October 5, 2009 and in reference  
to the Queens Topographical Bureau  
Datum





CROSS SECTION V-V'



LEGEND

- 2-inch diameter polyvinyl chloride (PVC) or steel well screen
- 6.19 Surface elevation at location
- 0.76 Groundwater elevation at bottom of well screen
- Equipotential Line (dashed where inferred)
- Groundwater Flow Direction

NOTES:

Elevations in reference to Borough of Queens Topographical Bureau by Montrose Surveying.

Groundwater elevations based on measurements collected on October 5, 2009

SCALE: NOTED

Datum. Top of Casing (TOC) and land surface measurements surveyed



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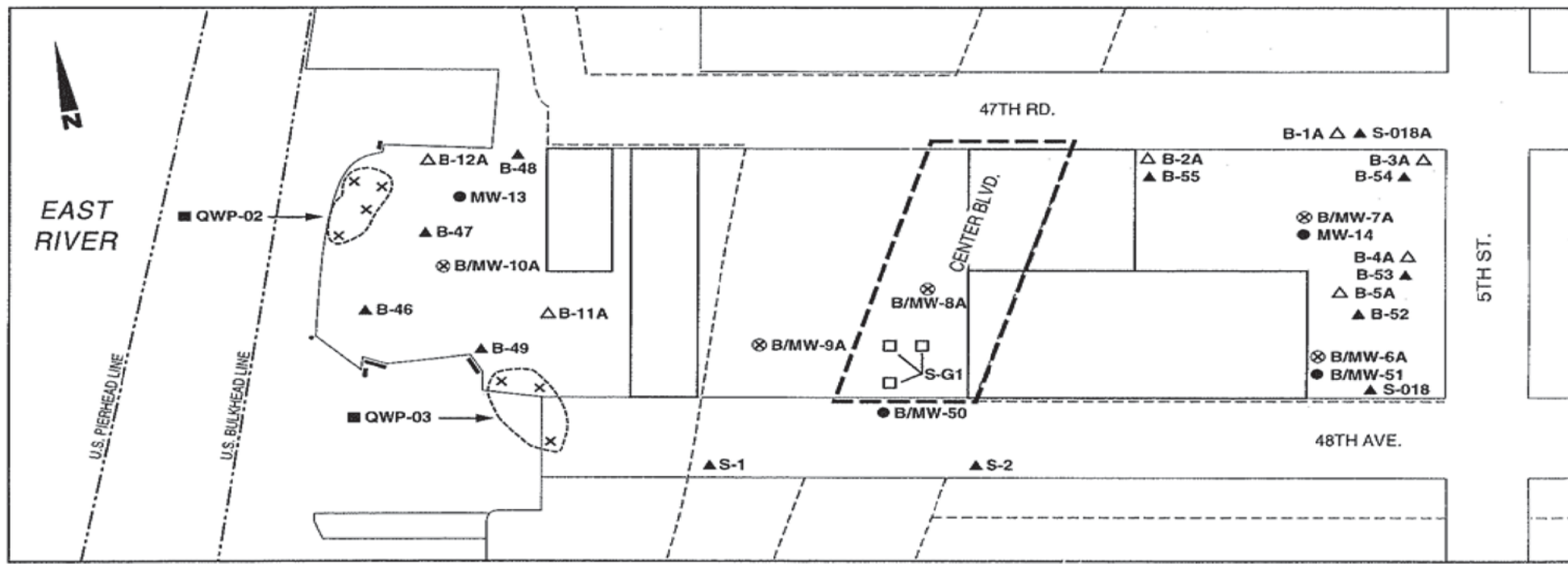
Queens West Development  
Parcel 8 +Off-Site Areas  
BCP Site No. C241087  
VCP Site No. 10094A

FIGURE 9C

Vertical  
Groundwater  
Contour Map

Date  
April 2010

Project Number  
10011-004-10



- Work Area Boundary  
 - - - Proposed Street
- ⊗ 1998 Soil/Groundwater Sampling Location
  - △ 1998 Soil Sampling Location
  - 1998 Soil Gas Location
  - Previous Soil/Groundwater Sampling Location (1989 Testing Program)
  - ▲ Previous Soil Sampling Location (1984-85, 1989 Testing Program)
  - Composite Sampling (1994 Testing Program)
  - x Discrete Sampling Location (1994 Testing Program)
  - Area of Composite Sampling (1994 Testing Program)

Not To Scale



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Center Boulevard Between  
 47th Road and 48th Avenue  
 Long Island City, Queens, NY

FIGURE 4A

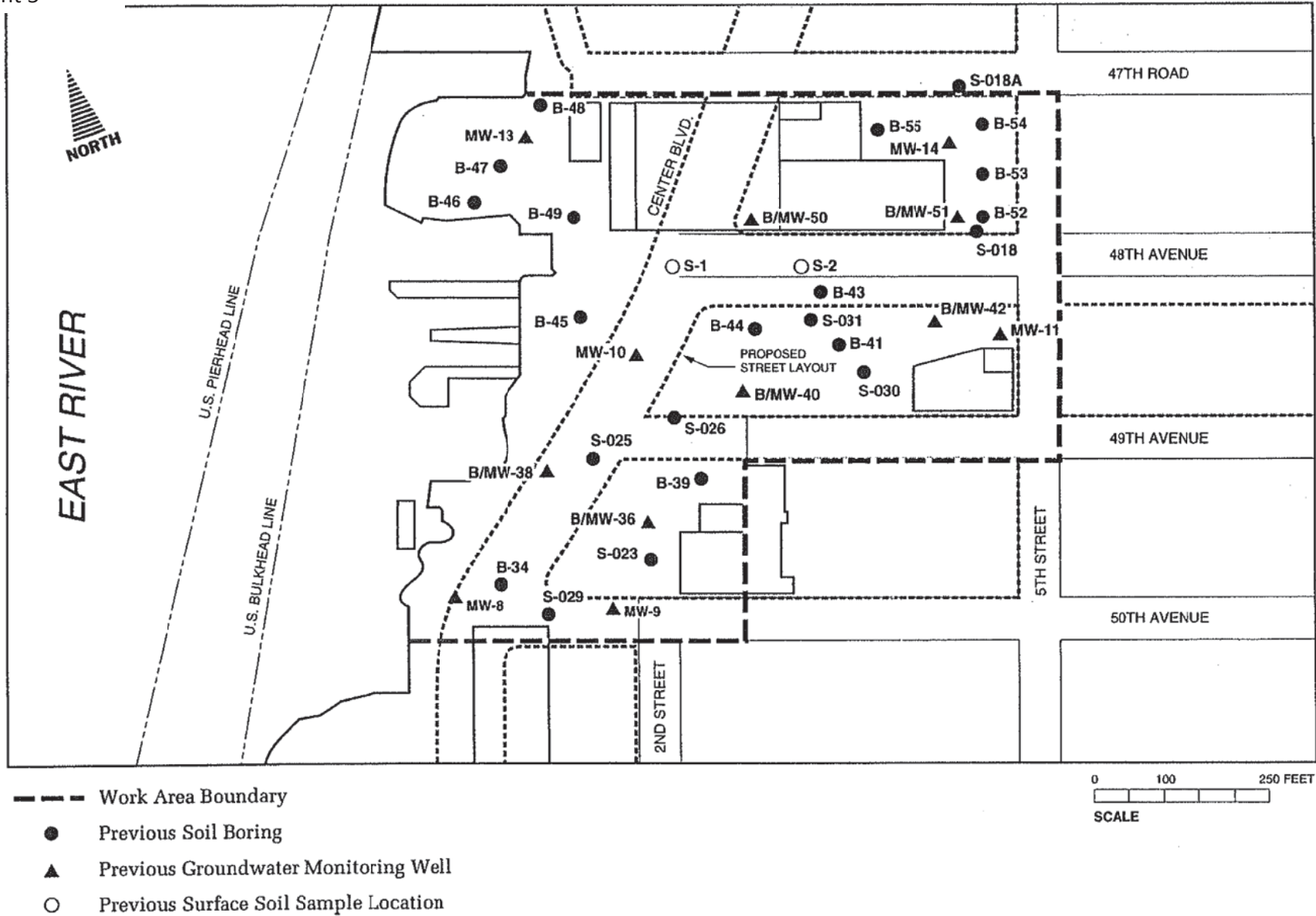
Date  
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Project Number  
 10011-004

## Sampling Locations from Previous Investigations

## LEGEND

Source: Remediation Work Plan For Center Boulevard Between 47th Road and 48th Avenue, AKRF Engineering, P.C., August 1998



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New York, NY 10001

Center Boulevard Between  
47th Road and 48th Avenue  
Long Island City, Queens, NY

FIGURE 4B

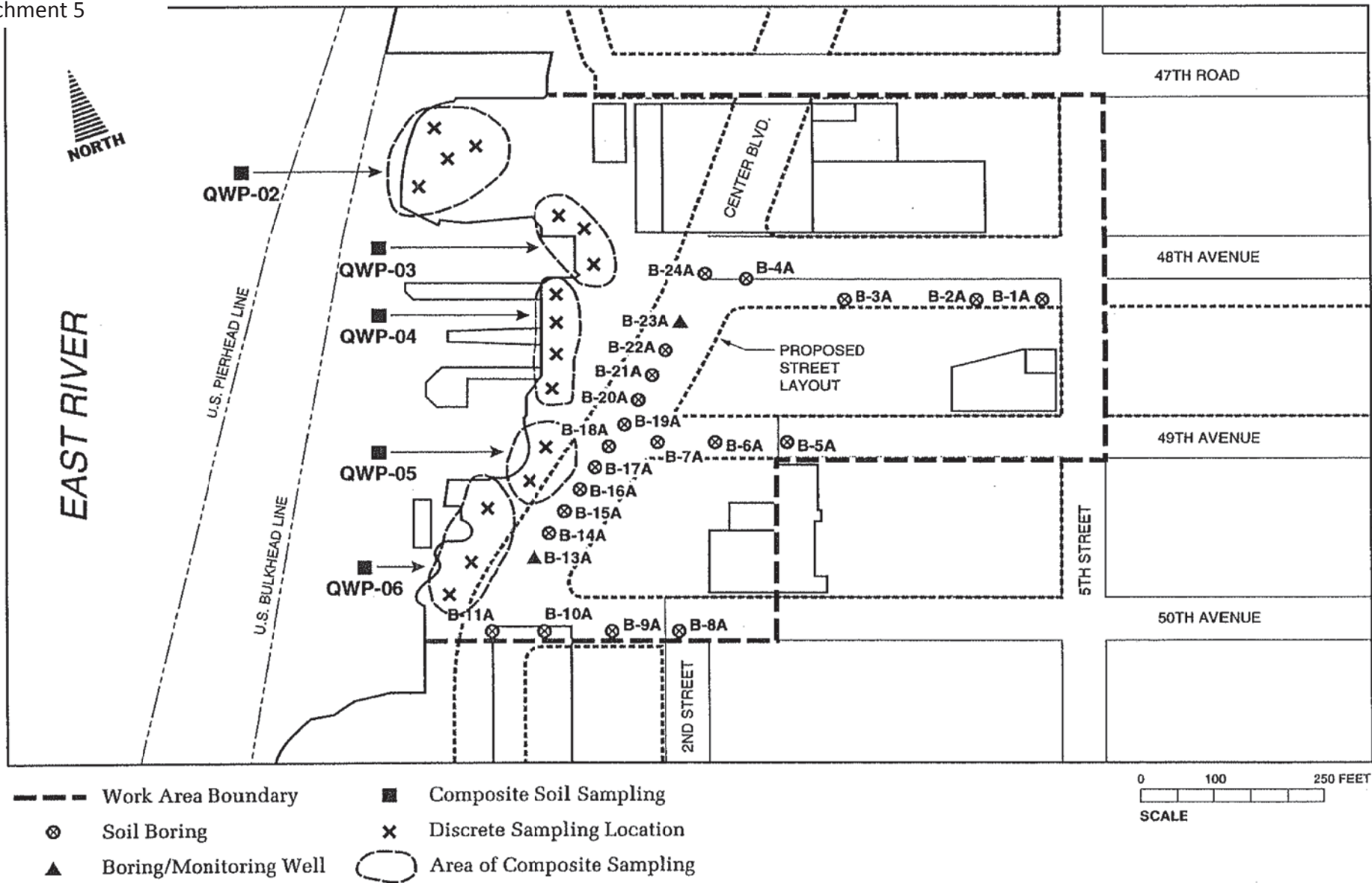
Date  
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Project Number  
10011-004

## Sampling Locations from Previous Investigations (continued)

## LEGEND

Source: Remediation Work Plan For Center Boulevard Between 47th Road and 48th Avenue, AKRF Engineering, P.C., August 1998



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New York, NY 10001

Center Boulevard Between  
47th Road and 48th Avenue  
Long Island City, Queens, NY

FIGURE 4C

Date  
May 2008

Project Number  
10011-004

## Sampling Locations from Previous Investigations (continued)

## LEGEND

Source: Remediation Work Plan For Center Boulevard Between 47th Road and 48th Avenue, AKRF Engineering, P.C., August 1998



## Attachment 6

ID	MW-34 (19-21)	
Sample Date	8/26/2009	
ene	110	U
oceanthracene	26600	
oarylene	10300	
oethylfluoranthene	13100	
oig.h. iperylene	2550	
oik.fluoranthene	2000	
oio.h.janthracene	902	
oio.1,2,3-edgylene	2640	
thalene	2200000	
anthrene	982000	
or 1254	8.8	U
hic	3.2	
im	55.8	
er	10.3	
	13500	
ury	0.039	U

Substance	MW-34 (12-13) 8/26/2009	
anthracene	250	U
benz[a]anthracene	186000	
benz[a]pyrene	2400	
benzofluoranthene	4000	
benzofluoranthene	547	
benzofluoranthene	962	
benzofluoranthene	191	
3-cd pyrene	631	
benzofluoranthene	4720000	
benzofluoranthene	677000	
benzofluoranthene	9	U
benzofluoranthene	3.3	
benzofluoranthene	36	
benzofluoranthene	17.9	
benzofluoranthene	17000	
benzofluoranthene	0.038	U

Country	1980	1985	1990	1995	2000	2005	2010	2015	2020
Japan	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
France	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5
Germany	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5
Italy	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5
Spain	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5
United Kingdom	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5
Sweden	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5
United States	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5

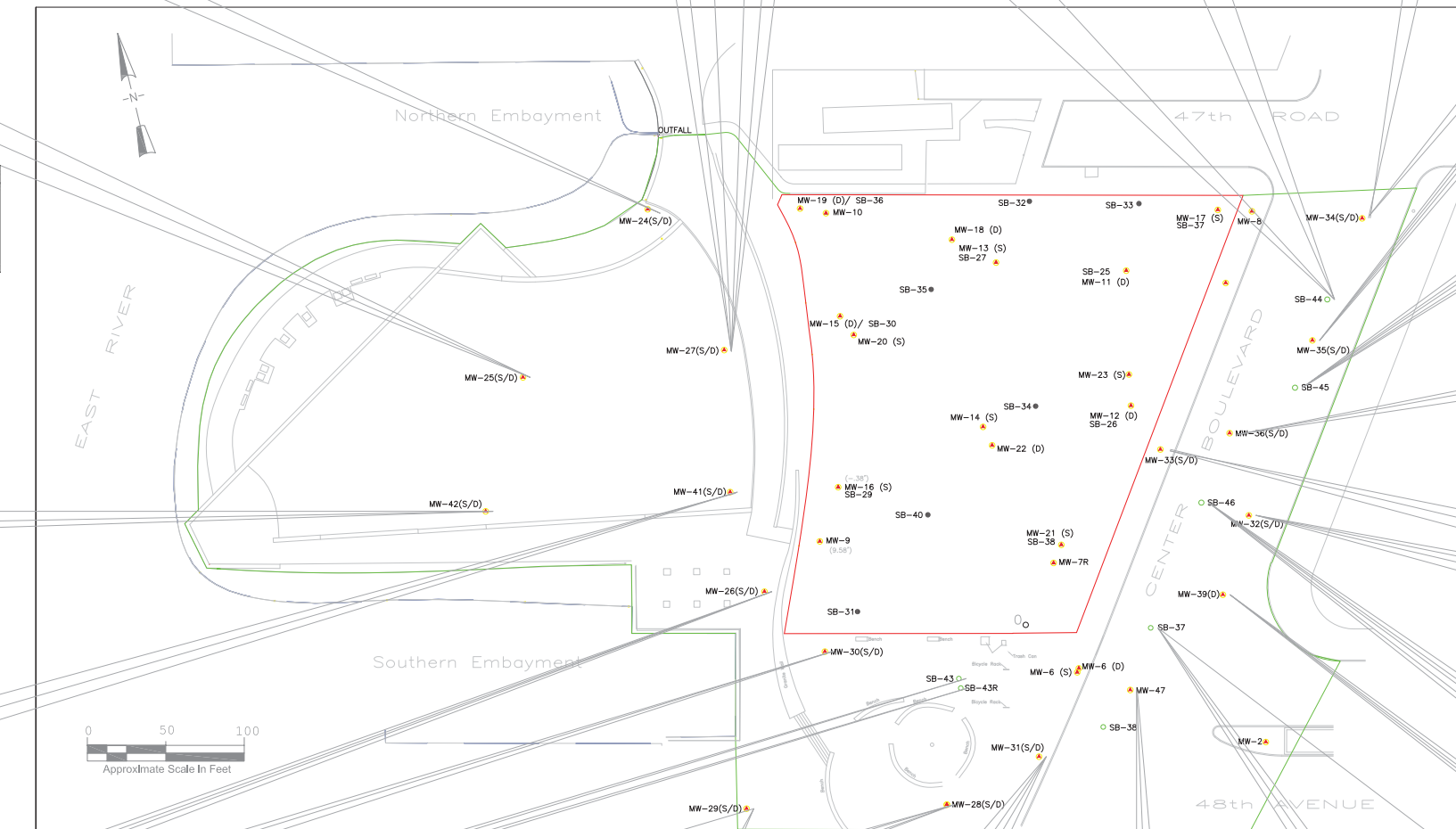
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A. A. E. C. M.

Sample ID	SB-37 (32-33)
Sample Date	8/12/2009
benzene	340
toluene	1980
o-xylene	354

cdofluoranthene	270		
benz(a,h)anthracene	26	J	
benz(1,2,3-cd)pyrene	65.8		
anthracene	7330		
for 1254	104000		
nic	8.3	U	
arm	U2.2	U	
per	36.5		
	16.3		
	14800		
ury	U0.036	U	



MW-35 (26-27)		
8/24/2009		
	230	U
	7388	
	7196	
	7130	
	686	
	1180	
	285	
	627	
	124000	
	99300	
	9.3	U
	2.5	U
	25	U

	0.038	U
58-45 (21-23)C		
8/26/2009		
66.5	J	
12300		
3140		
6000		
878		
3460		
379		
917		
162000		
296000		
8.8	U	
7.4	U	

10900		
6 039	U	
<b>SB-45 (27-29)</b>		
<b>8/26/2009</b>		
24	U	
831		
279		
359		
76.2		
228		
23.1	J	
78.5		
2800		
14900		
8.8	U	
2.3	U	
23	U	
5.7		

RW-32 (21-22)	
8/19/2009	
965	
12199	
1929	
2080	
550	
1370	
240	
473	
24400	

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Development  
T-Site Area  
C241087  
100094A

8 +  
Areas

Sample  
summary

2010

004-10

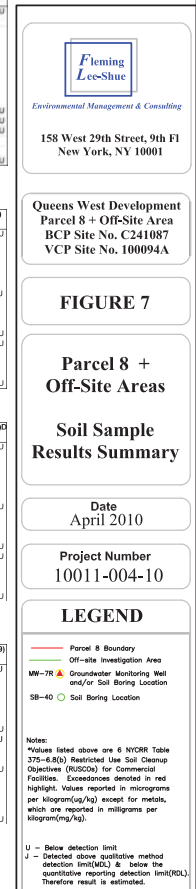
**END**

Boundary  
Investigation Area  
Monitoring Well  
Boring Location  
Location

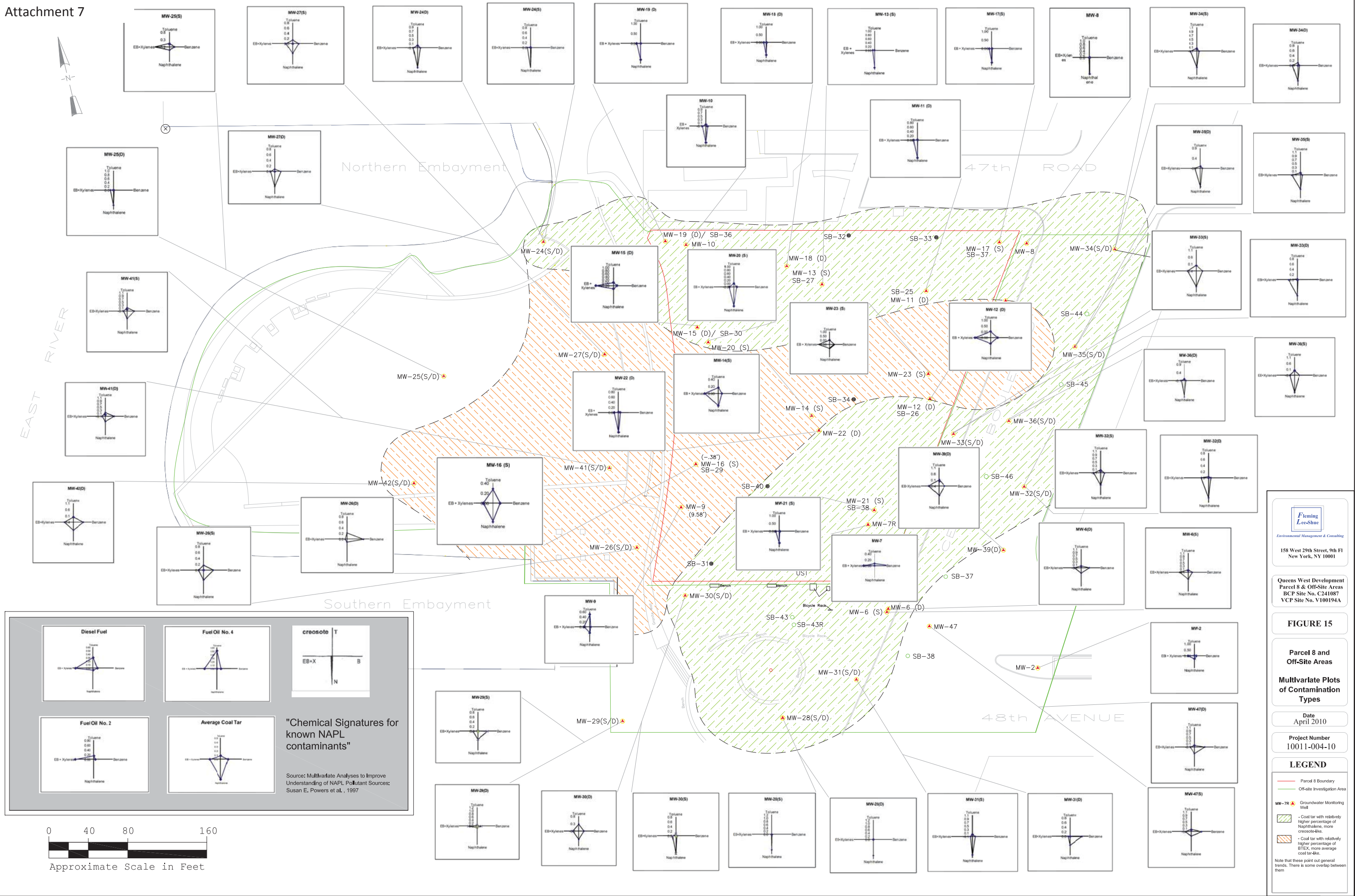
6. NYSER Table

denoted in red  
d in micrograms  
cept for metals,  
illigrams per

it  
litative method  
& below the  
detection limit(RDL).  
estimated.







Fleming  
Lee-Shue  
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Queens West Development  
Parcel 8 & Off-Site Areas  
BCP Site No. C241087  
VCP Site No. V100194A

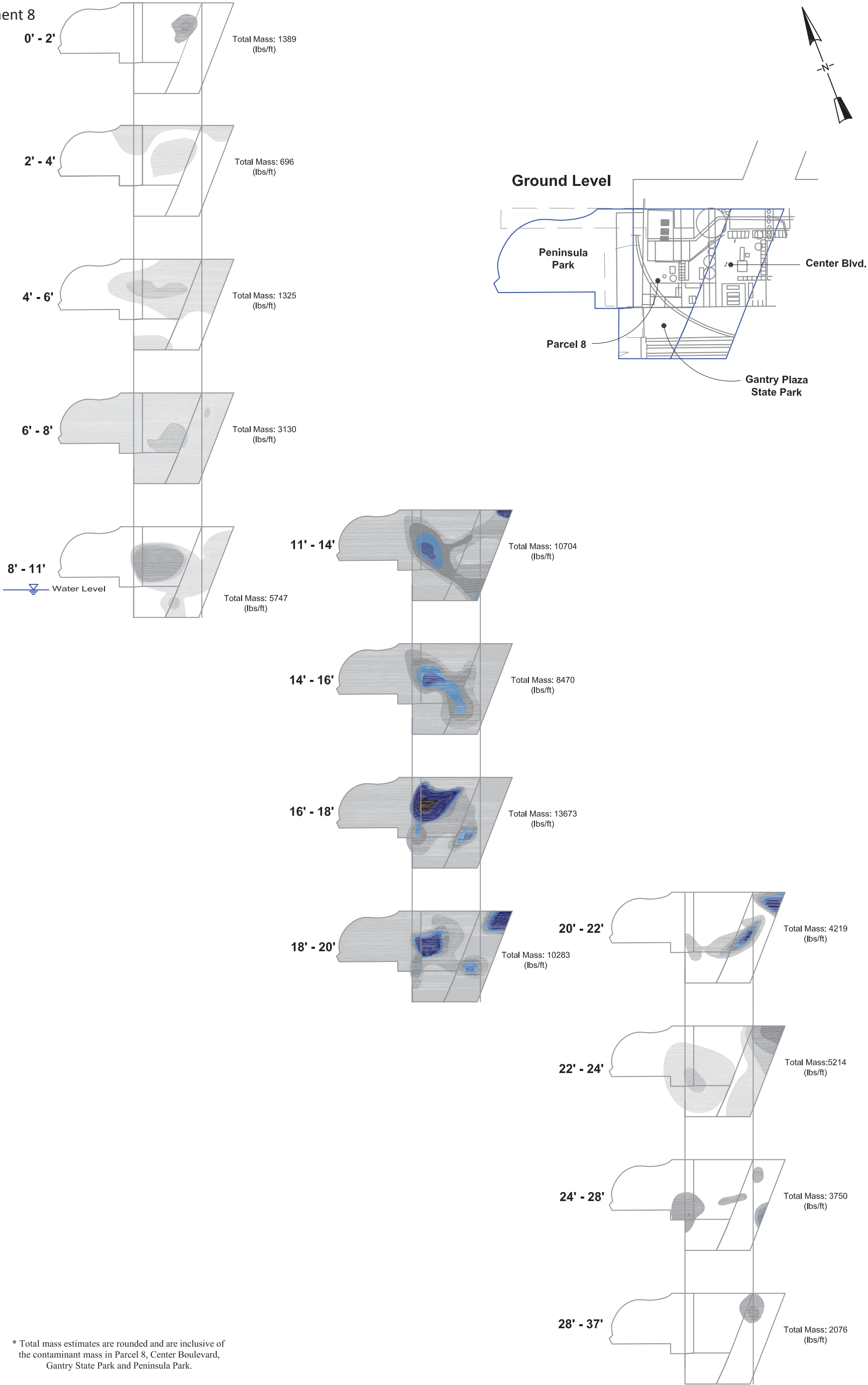
**FIGURE 15**  
**Parcel 8 and Off-Site Areas**  
**Multivariate Plots of Contamination Types**

Date  
April 2010  
Project Number  
10011-004-10

**LEGEND**

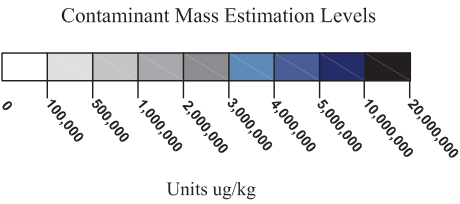
- Parcel Boundary
- Off-site Investigation Area
- MW-7R Groundwater Monitoring Well
- Coal tar with relatively higher percentage of Naphthalene, more creosote-like
- Coal tar with relatively higher percentage of BTEX, more average coal tar-like

Note that these point out general trends. There is some overlap between them.



\* Total mass estimates are rounded and are inclusive of the contaminant mass in Parcel 8, Center Boulevard, Gantry State Park and Peninsula Park.

LEGEND



Date  
April 2010

FIGURE 17

Project Number  
10011-007-1

Plate Views of  
Contaminant  
Source Area

Queens West Development  
Parcel 8 Off-Site Area  
BCP Site No. C241087  
VCP Site No. V100194A

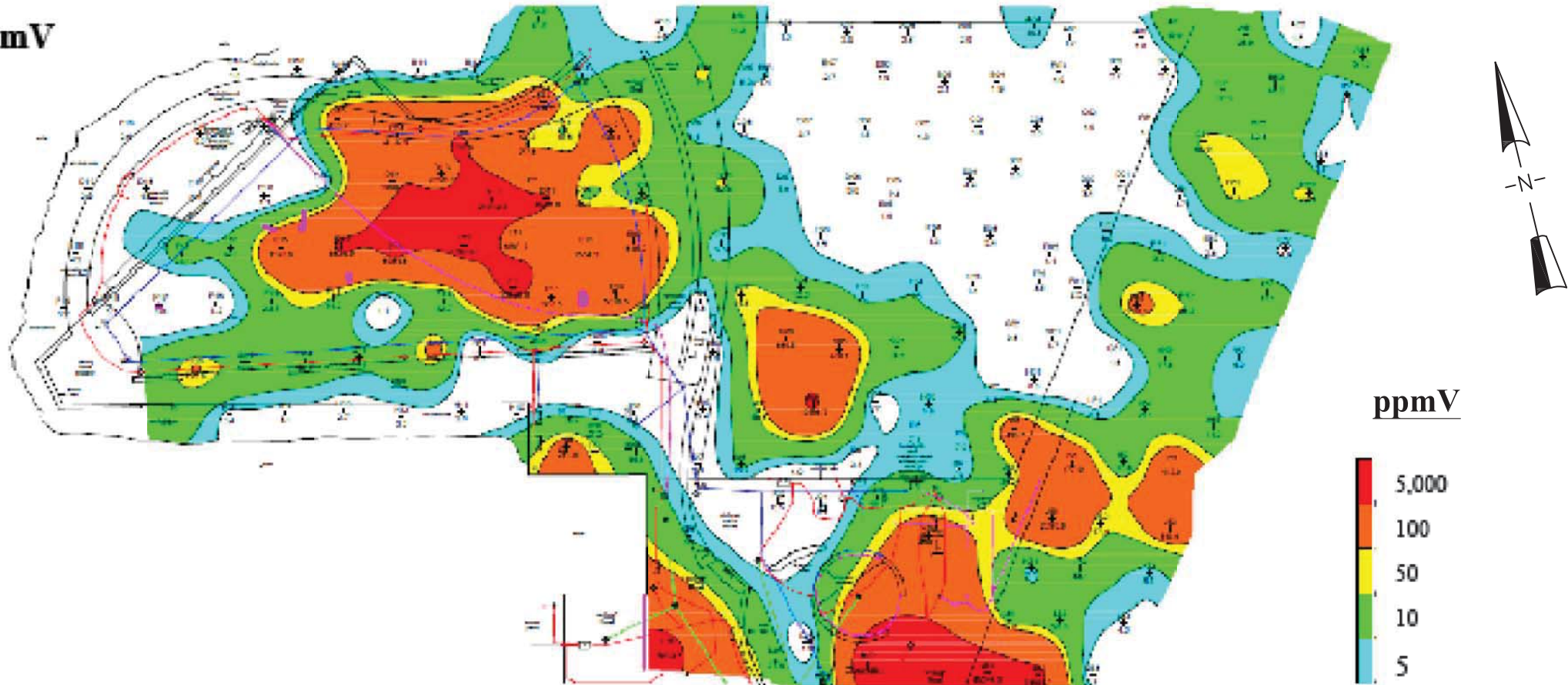


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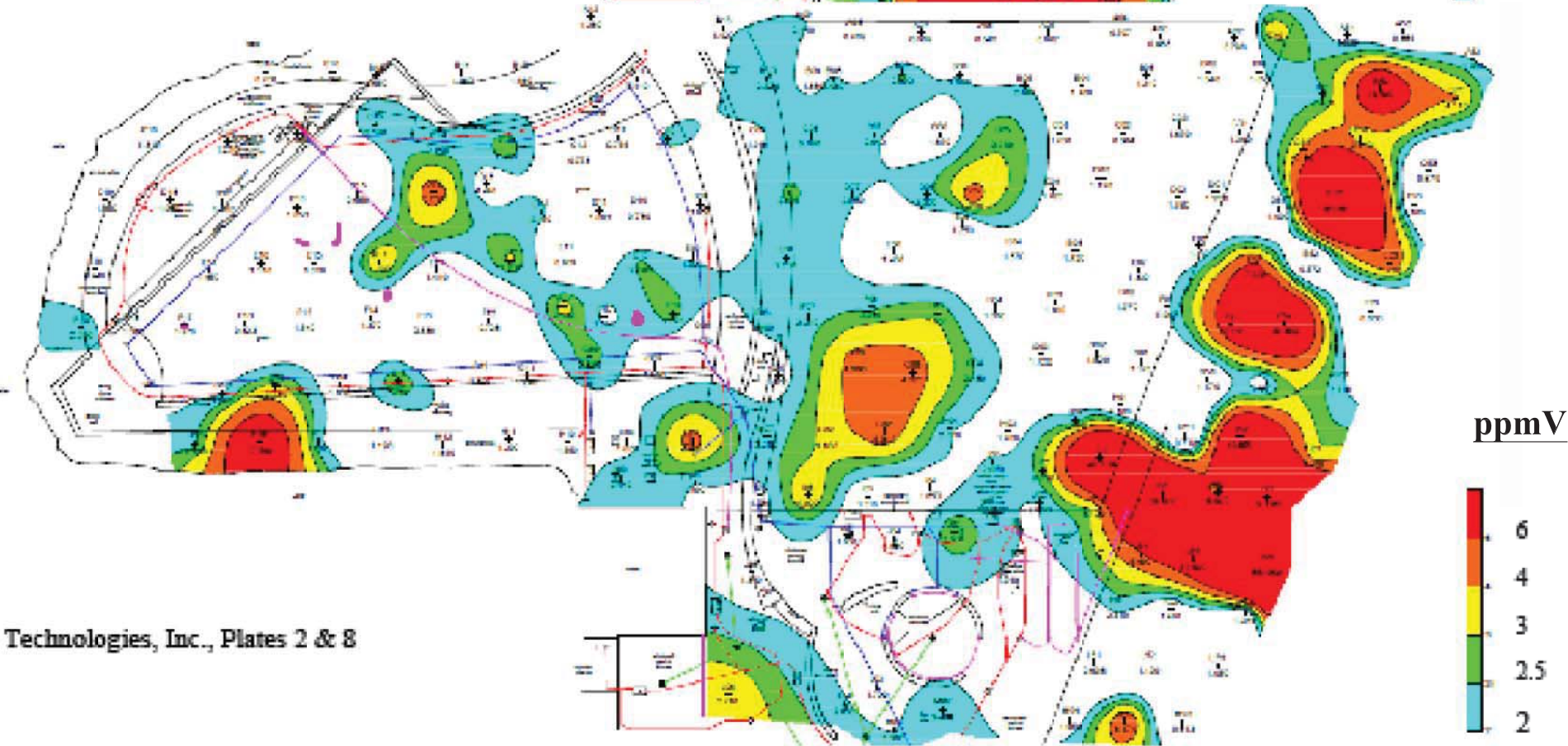
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Methane, ppmV



C5+, ppmV



Source: Exploration Technologies, Inc., Plates 2 & 8



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Queens West Development  
Parcel 8 + Off-Site Areas  
BCP Site No. C241087  
VCP Site No. V100194A

FIGURE 16

Parcel 8 and  
Off-Site Areas

Methane & C-5+  
Soil Gas results

Date  
April 2010

Project Number  
10011-004-10

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ppmV - parts per million by  
volume



[illegible]

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100

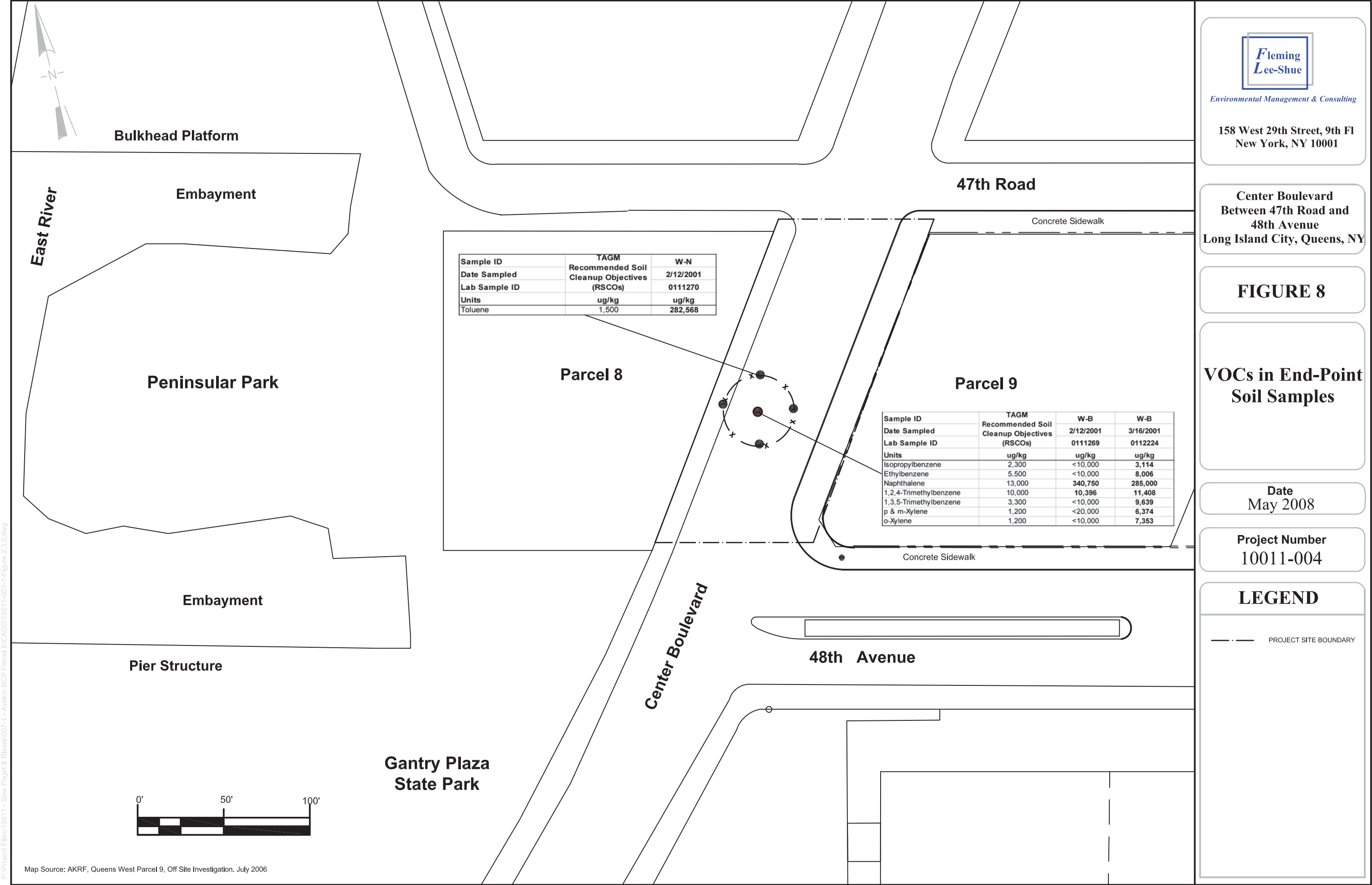
*Journal of Management Education* 36(8) 907-924

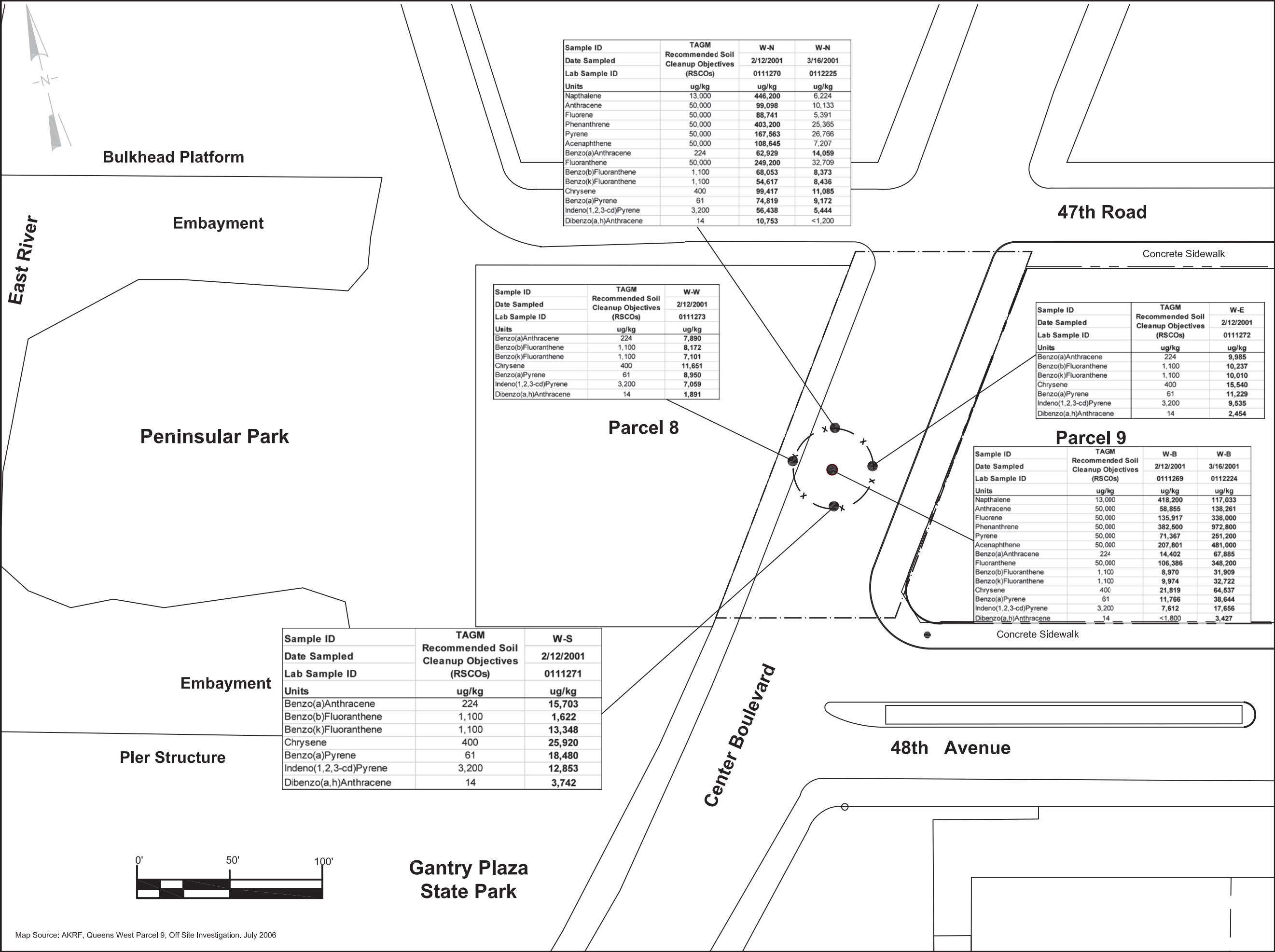
highlight. Values reported in micrograms

quantitative reporting detection limit(RDL).

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Center Boulevard  
Between 47th Road and  
48th Avenue  
Long Island City, Queens, NY

FIGURE 9

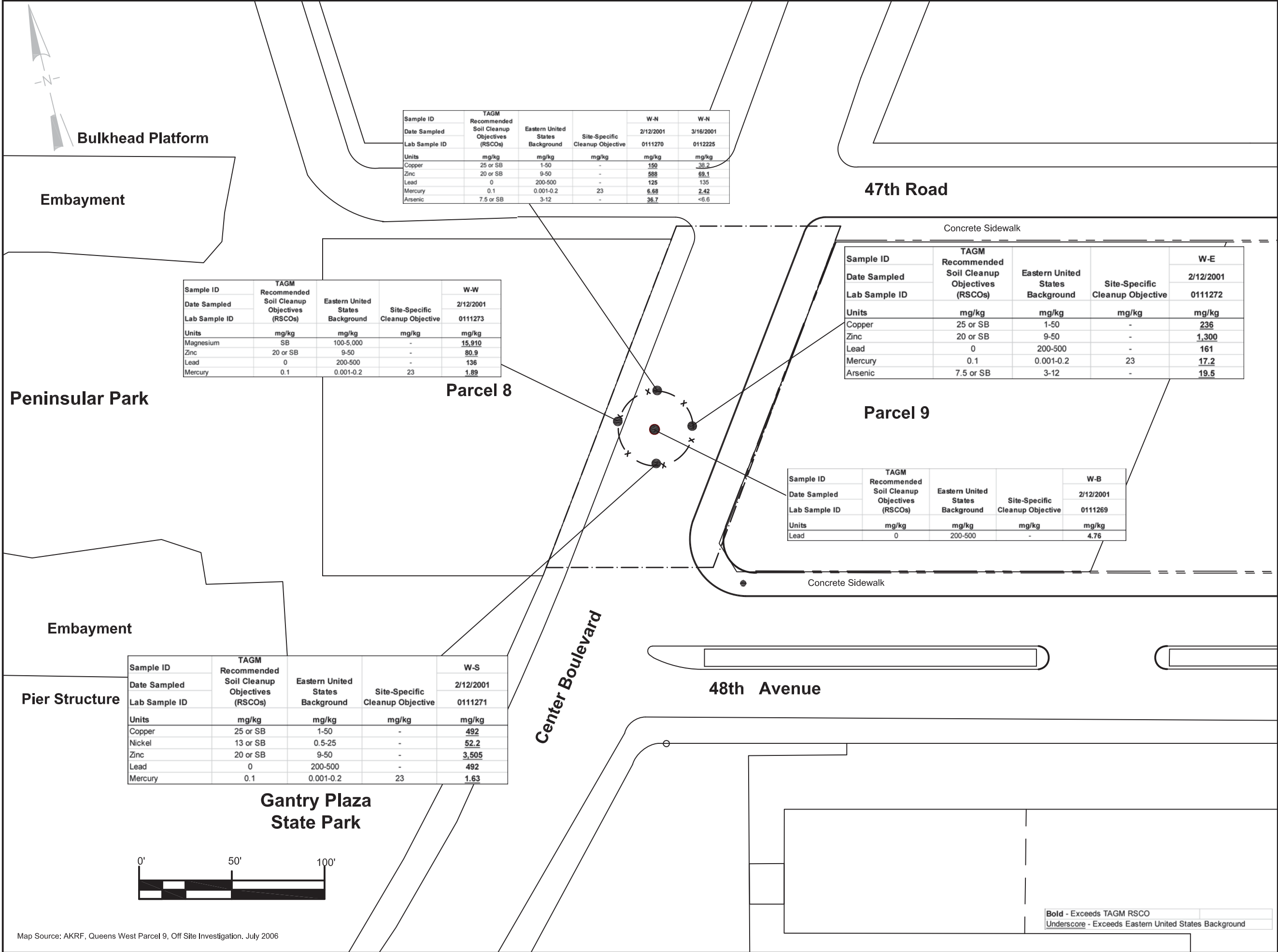
SVOCs in  
End-Point Soil  
Samples

Date  
May 2008

Project Number  
10011-004

LEGEND

PROJECT SITE BOUNDARY





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Center Boulevard  
Between 47th Road and  
48th Avenue  
Long Island City, Queens, NY

FIGURE 10

Metals in  
End-Point Soil  
Samples

Date  
May 2008

Project Number  
10011-004

LEGEND

— · —

PROJECT SITE BOUNDARY